An Exploratory Quantitative Archaeological Analysis and a Classification System of Chinese Ceramics Trade in the Western Indian Ocean: AD c. 800-1500

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An Exploratory Quantitative Archaeological Analysis and the Classification of Chinese Ceramics Trade in the Western Indian Ocean, AD c. 800-1500

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- Ran Zhang -

Abstract

Chinese Ceramics have been among the most important archaeological findings in the study of trade in the Indian Ocean from the 8^{th} to the 19^{th} centuries. They have the advantages of commonality, durability, identity and being unearthed in large quantities. Chinese ceramics provide clues for understanding trading trends and linking the Chinese production industries to consumption markets in the Indian Ocean. However, it seems that their crucial importance for field archaeology in the western Indian Ocean has not been well established, due to the lack of a comprehensive overview of Chinese traded ceramic archaeology and a systematic classification.

The thesis is concerned with how Chinese trade ceramics impacted on maritime trade in the western Indian Ocean from the 8^{th} to the 16^{th} century. Based on an archaeological report collecting data from 140 ceramic kiln sites in China and on archaeological ceramic material collected from 129 coastal sites and collections in the western Indian Ocean, this thesis has reviewed the archaeological and chronological development of Chinese trade ceramics. A systematic classification of Chinese trade ceramics in the western Indian Ocean has been developed and built, introduced with a review of the long-term history and researched using quantitative methods.

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Declaration

No part of this thesis has been submitted elsewhere for any other degree or qualification in this or any other university. It is all my own work unless referenced to the contrary in the text.

Statement of Copyright

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CHAPTER 1: INTRODUCTION

This thesis aims to provide some new perspectives on Chinese trade ceramics from the 9th to 16th centuries. At its core is a new classification and evaluation of Chinese ceramic industries of the period with a focus upon distributions in the western Indian Ocean and the hope is that this classification will prove to be useful to future scholars. Although several smaller-scale studies have been completed previously, this is the first comprehensive large-scale consideration of the topic.

Three important observations lie behind this thesis. First, contemporary studies of Chinese ceramics are predominantly focused on complete, high quality and well-known Chinese ceramics (cf. Medley 1974, Kerr 1986, He 1996, Harrison-Hall 2001, Kerr 2004, Li et al. 2010b). Although these are all high-quality, scholarly works, these studies are not always so well suited to the identification, dating and interpretation of large assemblages of trade ceramics from archaeological survey and excavation, particularly in the western Indian Ocean, because of the predominantly low quality and fragmentary nature of the sherds recovered from such contexts (Kennet 2004:60). An overview of archaeological studies of Chinese ceramics, which takes these points into consideration, is therefore a rather important gap to fill if we are to link Chinese ceramic archaeology to finds from the western Indian Ocean.

Second, there is no detailed, systematic classification of Chinese trade ceramics before the 16th century that is aimed at archaeological assemblages. This creates problems for the archaeologist because it affects the assessment of archaeological sites, the interpretative analysis of artefacts, and an understanding of the cultural environment for reconstructing human behaviours and societies (Shepard 1956, Orton et al. 2010:1993). The lack of such a classification therefore inhibits a fuller understanding of the historical framework behind ceramic finds and sites, perspectives on cultural function, economic distribution, social interaction between regions, and regional organisation (Rice 1987:35-36, Sinopoli 1991, Nishitani 2012). In the case of Chinese ceramics, in particular, they are found in high volumes and they tend to be decorated and have specific forms and fabrics. Once more, understanding of the location and production of ceramic workshops in China has greatly improved over the past fifty years so there is an opportunity to link together shape, decoration, manufacturing methods and ceramic fabrics.

Thirdly, due to traditional linguistic and methodological disjunctures between archaeologists working on trade ceramics from the western Indian Ocean (mostly Westerners) and those working on Chinese mainland archaeology (mostly Chinese), it is often difficult to link interpretation and understanding of the trade ceramic material from the western Indian Ocean to the increasingly large and important body of knowledge that exists in China related to developments in the chronology, classification, manufacture and export of ceramics. To give an example, it is sometimes difficult to interpret clearly-observed trends in the use of trade ceramics in the western Indian Ocean. Do they result from changes in the organisation of trade, or changes in manufacturing in China – or indeed both?

1.1 Aims

Based on these observations, the main aim of this thesis is to produce a standardised and systematic classification of Chinese trade ceramics (see Chapter 4) which is aimed at the identification of fragmentary assemblages and which considers both ceramic production in China and consumption of Chinese ceramics from the 9th to 16th centuries in the western Indian Ocean. More specifically, the thesis will:

- Review available information on Chinese ceramic industries;
- Examine the distribution patterns of Chinese ceramics;
- Develop a stronger understanding of the development of production, identification, and the consumption of traded Chinese ceramics from coastal sites in the western Indian Ocean;
- Present an updated, standardised and systematic classification of Chinese trade ceramics in the western Indian Ocean that is informed, as much as possible, by recent work in China and which aims, wherever possible, to be applicable to

the highly fragmentary archaeological assemblages of the type that are commonly found in the region.

1.2 General background

The question of the relationship between intensified ancient trade in the areas around the Indian Ocean, especially in China and the western Indian Ocean, has been a significant subject for archaeologists and historians in recent years as the importance of this subject to the historical development of the world economy has become more clearly understood. In the past, there was an overwhelming European bias in the study of this subject, much of which still remains. This bias is due to the large body of historical documentary evidence that was left by European traders after the beginning of the 16th century, which is much more detailed than that for previous centuries in the western Indian Ocean. However, this has often led to the very important role played by Chinese, Arab and other local traders, especially in the period up until the development of the 'East India Companies' in the 17th century, being undervalued or even completely ignored. This period is sometimes referred to as the 'pedlar trade' by Western scholars, a term which suggests that it was much less developed and less important than trade by Europeans (Steensgaard 1974).

This attitude began to change in the late 1980s, especially with the publication of works such as Janet Abu-Lughod's *Before European Hegemony: The World System A.D. 1250-1350* (1989). Her work makes clear that very highly developed and significant trading systems existed in the region long before the arrival of the Europeans in the late 15th /early 16th century. One of the problems in studying this period is that historical sources dealing with the conduct of trade are very few, or indeed almost non-existent, for many periods and places (Abu-Lughod 1989:28). This means that studying archaeological evidence is the only way in which the nature and development of these pre-European trading systems can be properly understood. Even so, interpretations of these archaeological materials, especially Chinese trade ceramics in the western Indian Ocean region still contain a lot of important evidence that remains to be unlocked by further academic study.

As a common item on cargo lists, Chinese ceramics were exchanged for organic products, gemstones and other commodities from the western Indian Ocean from the late 8th century onwards (Anonymous 1998, Ptak 1999, Lin and Zhang 2015). Although Chinese ceramics make up only a very small percentage compared to other ceramic wares on western Indian Ocean archaeological sites (Scanlon 1971, Rougeulle 1996:175-176, Kennet 2004:60, Rougeulle 2005:226), they have great historical significance as one of the most important elements of archaeological evidence; Chinese trade ceramics are not only an important source of dating evidence for sites in the western Indian Ocean, but they also contain evidence of key economic and cultural connections and have a cultural significance transcending their abundance and utility in Indian Ocean societies. They were often regarded as highly precious indicators of wealth, status, ritual practice and other social values (Appadurai 1986, Sherratt 1999:163-164, Zhang 2013, Zhao 2013:76).

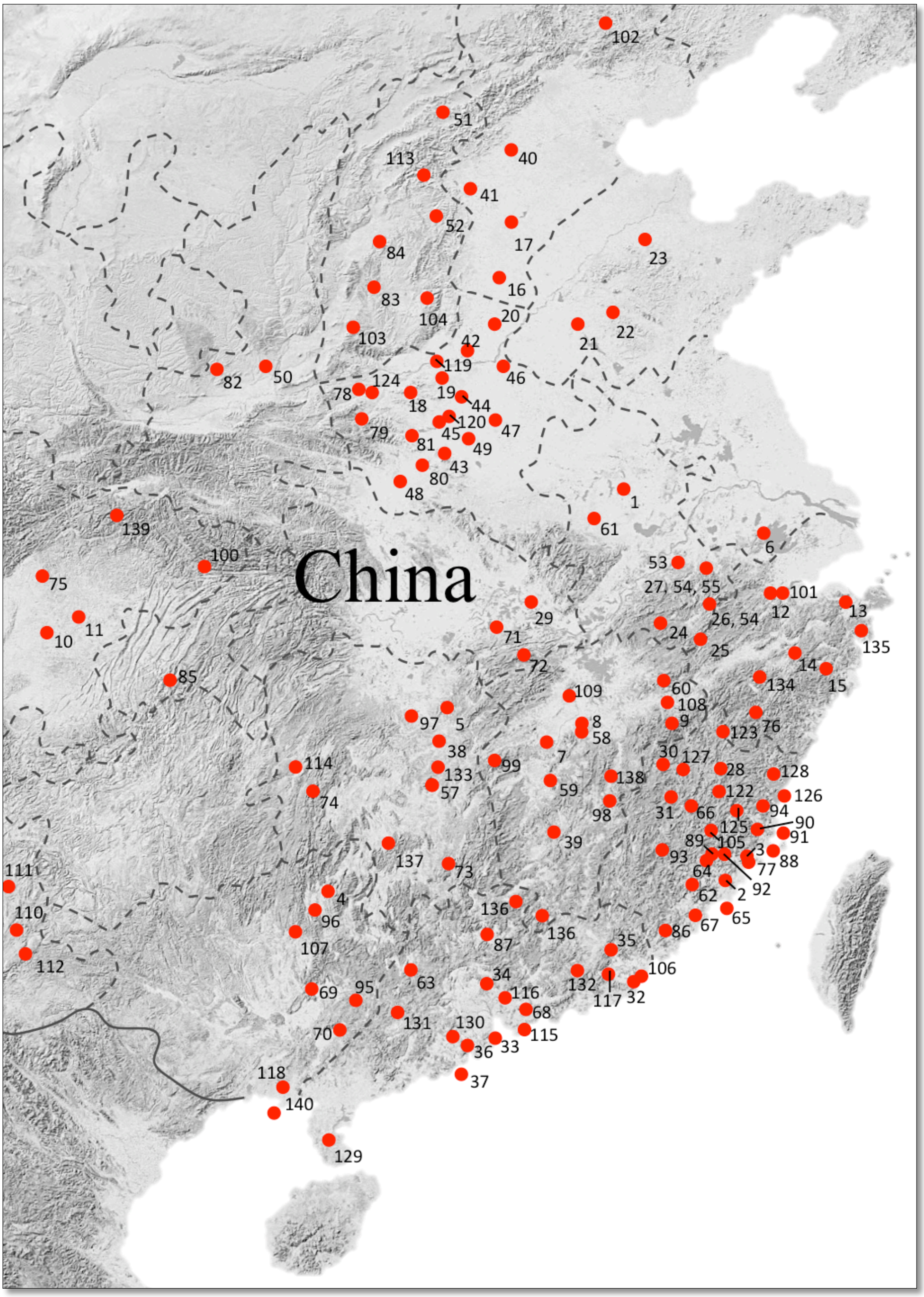
Despite the availability and accessibility of a great deal of new archaeological evidence, Chinese trade ceramic studies have not yet been fully investigated with regard to many aspects of the structures that existed between production in China and consumption in the western Indian Ocean, such as the merchants and their networks, the price of goods and details of trade routes and methods. This is often because new developments in of the manufacture and chronology of Chinese ceramics cannot be directly linked to western Indian Ocean archaeology, while a standardised and systematic classification of Chinese trade ceramics that incorporates such information is still not available.

1.3 Chronological and geographical scope of study

There is of course a considerable body of highly erudite scholarly research into Chinese ceramics that were exported to Europe after the 16th century, such as the Kraak porcelains (Rinaldi 1989, Pei 1999a, Xiong 2006a, Canepa 2010, Li 2010a), armorial porcelain (Howard and Wagner 1974), the Chinese ‘willow pattern’ porcelains (Fisher 1989, Beddoe 2008, Zhang and Li 2013), Kitchen Ch'ing porcelain, Nonya ware (Willetts and Lim 1981) and historical and general studies of the late trade porcelains (Scheurleer 1974, Madsen and White 2011, Kerr et al. 2011, Gerritsen and McDowall 2012). However, the study of early Chinese trade ceramics before the 16th century is still comparatively weak. While there are more and more publications and studies that cover this topic (cf. Krahl 1986a, b, Kerr 2002, Krahl et al. 2010, Crick 2010), and there are increasingly archaeological fieldwork projects that report finds of this kind (e.g. Guy 1986, Tampoe 1989, Horton et al. 1996, Kennet 2004, Priestman 2005, Zhao 2006, Yuba 2014), there is no monograph that covers these early Chinese trade ceramics in a systematic way. The need for such a pre-16th century corpus has become particularly pressing in recent years because of the large quantity of early Chinese ceramics unearthed from sites around the western Indian Ocean (Dataset 3 in Appendix 3)[1].

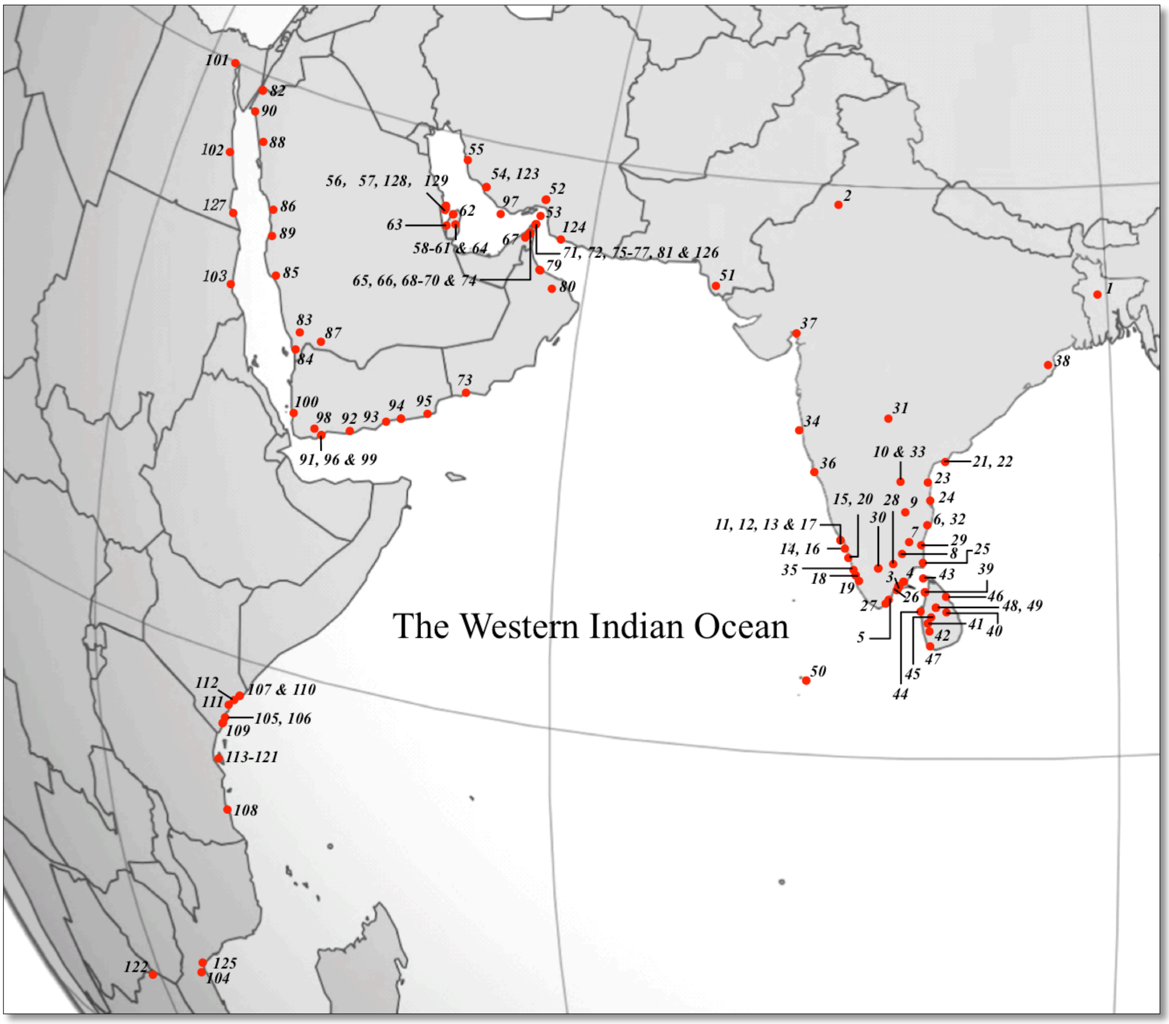
As a long-term, comprehensive and broad area study, this thesis is nothing if not ambitious in its scope. In total over 300 archaeological sites are covered, including ceramic kiln sites located in China (Map 1.1) and archaeological sites in the western Indian Ocean (Map 1.2), which yielded Chinese ceramic findings that have been collected and recorded in Datasets 1 to 3 (Appendices 1 to 3). The information that has been collected, which includes the classification and quantification of in Datasets 1 to 3, was not standardised and lacked detail in many cases making it difficult or impossible to make reliable comparisons between sites and regions and between 'consumer sites' in the western Indian Ocean and 'producer sites' in mainland China. Therefore, a key aim of this thesis will be to standardise and systematise the large volume of information according to a clear and simple quantitative approach (Tufte and Graves-Morris 1983, Tufte 1991, Shennan 1997:21).

[1] The Dataset 3 in Appendix 3 presents over 28,000 sherds of Chinese trade ceramics in more than 570 assemblages in over 40 classes and from 129 archaeological littoral sites in the western Indian Ocean. This dataset is collected by author. The detailed information and references can be seen in Dataset 3.



Map 1.1: The mainland of China, showing kiln sites mentioned in this thesis.

(The names of these 140 sites can be found in Datasets 1 and 2 in Appendices 1 & 2. The list of site names is on pages 51-52)



Map 1.2: Western Indian Ocean, showing sites mentioned in this thesis.

(The names of these 129 sites can be found in Dataset 3, in Appendix 3. The list of site names is on page 128)

However, this thesis can by no means claim to be an all-inclusive study of Chinese ceramic trade. The geographical scope of the thesis is focused on the western Indian Ocean, consisting of the areas of India, the Gulf, the Red Sea and Eastern (Map 1.2). The chronological scope is from the late 8th century, the time when Chinese ceramics were first regularly imported to the western Indian Ocean, to the early 16th century, when European merchants first entered the Indian Ocean.

1.4 Structure of this thesis

This thesis consists of six chapters. Following this introduction (Chapter 1), Chapter 2 presents an archaeological overview of the development of the Chinese ceramic industries along with a brief literature review of their history. This chapter attempts to deal with a bias towards historical records in our understanding of the development of Chinese ceramic manufacture by collecting and analysing data from about 140 kiln sites published by archaeological missions in China, two datasets (Datasets 1 and 2, see Appendices 1 and 2). These discussions provide information about the archaeological dating evidence of Chinese ceramics along with exploratory and summary statistical analyses of the distributions of Chinese ceramic kilns and changes in the classes of ceramic that were produced over time.

Chapter 3 provides an archaeological overview of Chinese ceramic materials discovered in the western Indian Ocean. A brief literature review shows the historical development of Chinese ceramic trade in the western Indian Ocean. By examining key studies on Chinese ceramic trade with the western Indian Ocean, this chapter focuses on changing trends in Chinese ceramic occurrences and distributions. Over 120 archaeological sites in the western Indian Ocean have been collected in this chapter (Dataset 3 in Appendix 3). Based on an analysis of over 570 assemblages of Chinese ceramics unearthed from these archaeological sites, this chapter suggests that there were four main periods of Chinese ceramic trade with the western Indian Ocean.

Chapter 4 presents an updated classification of Chinese trade ceramics that were imported to the western Indian Oceans from the 8^{th} to the 16^{th} centuries. It identifies six Chinese major ceramic ‘complexes’: celadon, Qingbai (青白: bluish white) wares, white wares, blue and white ceramics, polychrome wares, and transport jars. These complexes are then divided into over 40 classes of ceramics. Each of these classes is presented along with definitions, descriptions, distributions, a discussion of dating evidence and drawings.

Chapter 5 gives a preliminary overview interpretation of Chinese trade ceramic patterns in the western Indian Ocean, based on a consideration of both changes in production in China and patterns of consumption in the western Indian Ocean. The four periods of Chinese ceramic trade suggested in Chapter 3 are used to discuss this material and are further and separately discussed.

Finally, the conclusion of this thesis assesses the importance of a standardised and archaeologically 'usable' classification of Chinese trade ceramics imported to the western Indian Ocean, which allows for quantitative analysis of the trade and economic history behind the trade. It also discusses the limitations of this work and suggests potential approaches for future research.

1.5 Terminology

Many differing terminologies have been used by Chinese and Western scholars to describe the names or systems of Chinese ceramic kiln/kiln site distributions, and Chinese ceramic fabrics. For instance, in relation to ceramic fabrics, 'stoneware' and 'porcelain' are both covered by the Chinese term '*ci* (瓷)'. Another example is the tendency amongst Chinese to refer to '*ci*' to describe a ceramic as being dense and resonant when fired, rather than white and translucent (Kerr and Wood 2004:140). But in English, stoneware and porcelain are clearly differentiated terms for ceramics. Hence, a short discussion of these concepts and terms is needed to clarify their use in this thesis. This discussion is not aimed at a complete comparison of Chinese and Western ceramic terminologies but is presented for reasons of clarity and to avoid unnecessary confusion.

1.5.1. Kiln structure, kiln complex, kiln site and ceramic complex

In Chinese ceramic terminology, 'kiln' (窑 *yao*) can refer to many definitions such as the 'kiln industries', a 'ceramic workshop' (which includes places for preparing clay, glazing and firing)' or, sometimes, the ceramic wares (e.g. Kerr and Wood 2004:30). However, rather than being concerned about the precise translation of such terms, for the purposes of this thesis the main focus is to create a terminology in relation to kilns and kiln complexes that is clear and consistent throughout the thesis in order to avoid confusion. The following definitions will therefore be used:

(1) Kiln structure

The term 'kiln structure' (窑炉/窑炉结构 *yao lu* or *yao lu jie gou*) is used to describe a single kiln structure. For example, the Dayao kiln structure would refer to the kiln excavated by the Zhejiang Provincial Archaeological Institute in 2009 (ZJSWWKGYJS et al. 2009).

(2) Kiln complex

A 'kiln complex' refers to a place (a village, a town or a city) with a ceramic industry, which has many ceramic kiln structures and workshops that were located close to each other and manufactured a similar ceramic product or products. In this thesis, 'kiln complex' will be used in the form of 'the … kilns', such as 'the Yue kilns (越窑)', 'the Longquan kilns (龙泉窑)' and 'the Jingdezhen kilns (景德镇窑)'.

(3) Kiln sites

The term 'kiln site' or 'kiln site' (窑址 *yao zhi*)' refers to an archaeological excavation (or many excavations) at a 'kiln complex'. In this thesis, it is in particularly used to describe the collected kiln sites in Datasets 1 and 2 (Appendices 1 and 2). For example, 'the Longquan kiln sites (*Longquan yao zhi* 龙泉窑址)' means the key archaeological excavations including Dayao (ZJSWWKGYJS et al. 2009), Longquan Dongqu (ZJSWWKGYJS 2005), Jincun (Zhang 1989a), Anrenkou (SHBWGKGB 1986), and Shang Yan'ercun (Li et al. 1986) kiln sites.

(4) Ceramic complex

The concept of a ceramic complex (窑系 *yao xi*) is complicated and still hotly debated in Chinese ceramic archaeology (cf. Liu 2002, Qin 2007). Here the meaning of the term has been established independently for this thesis. In Chapter 4 of the thesis, the term 'ceramic complex' is used to describe a group of ceramic classes that share a number of similar features such as the same glaze colour or type of decoration. Six complexes are presented in this classification: celadon, white ware, Qingbai ware, blue and white ware, polychrome ware and transport Jars. Their detailed definitions can be found in Chapter 4.

1.5.2 Earthenware, stoneware and porcelain

In this thesis the definitions of ‘earthenware’, ‘stoneware’ and ‘porcelain’ are used to mean the following:

(1) Earthenware:

Earthenware can be distinguished from stoneware by the following features: it is fired at a lower temperature (up to about 800 – 1,000 ℃, Table 1.1); it has a porosity of more than 5%; it often has no glaze. (Hamer and Hamer 1975:111, Rice 1987:14-15, Li 1998:2, Kerr and Wood 2004:9).

However, it should be noted that Sancai wares (Figure 1.1: left) have a relatively soft, porous and light yellow body, sometimes containing visible sand and black inclusions and covered by lead glaze (Li 1998:466) (Figure 1.1: right). In Chinese ceramics, it can be attributed to earthenware.

Figure 1.1: A Sancai vase (left) found at the Beiyaowan Tomb in Gongyi City (851 AD). *(BJYSBWG 2011:165) and a base of a high fired earthenware (right) (Collection of Oriental Museum of Durham University, photography by Ran Zhang)*

(2) Stoneware:

In this thesis, ‘stoneware’ refers to hard-bodied ceramics lying between earthenware and porcelain that are normally fired between 1,050 and 1,200℃ (Table 1.1). They have a hard but crude body with a colour varying from light grey, grey, dark grey, yellowish grey, red, brown to black because the firing temperature cannot be well-controlled. They look like a lower quality fabric and are similar but harder and denser than earthenware (Figure 1.2).

Higher quality stonewares have a hard, dense and pure body with a colour that varies from light grey to grey. High quality stoneware needs a high temperature firing at about 1,200℃. In the temperature range 1,050-1,200℃, the ceramic body begins to vitrify and pores begin to close, giving a very different feel (Rice 1987:104, Kerr and Wood 2004:9) (Figure 1.3: lower part, Table 1.1).

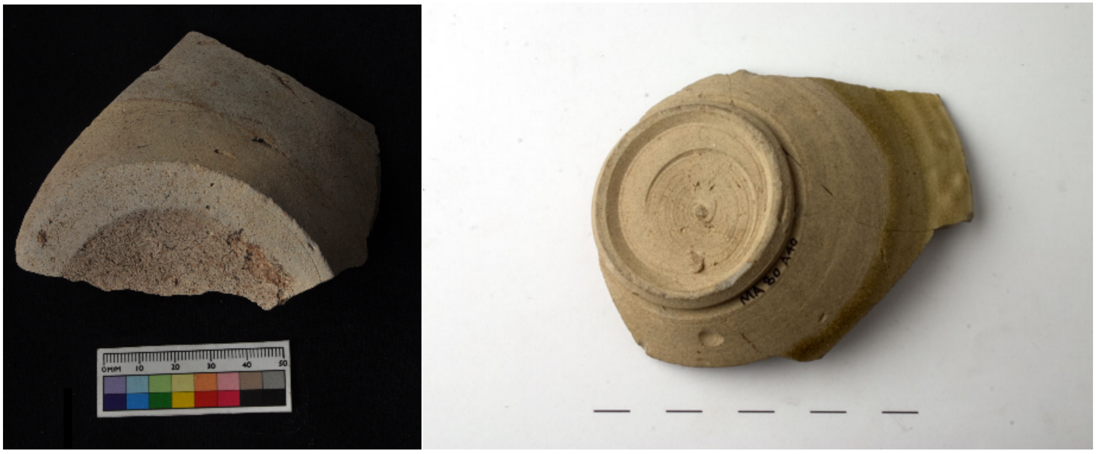


Figure 1.2: Lower quality stoneware sherds.

Unearthed from Yapawu (left) (photography by Ran Zhang) and Mantai (right) (Carswell et al. 2013), Sri Lanka.

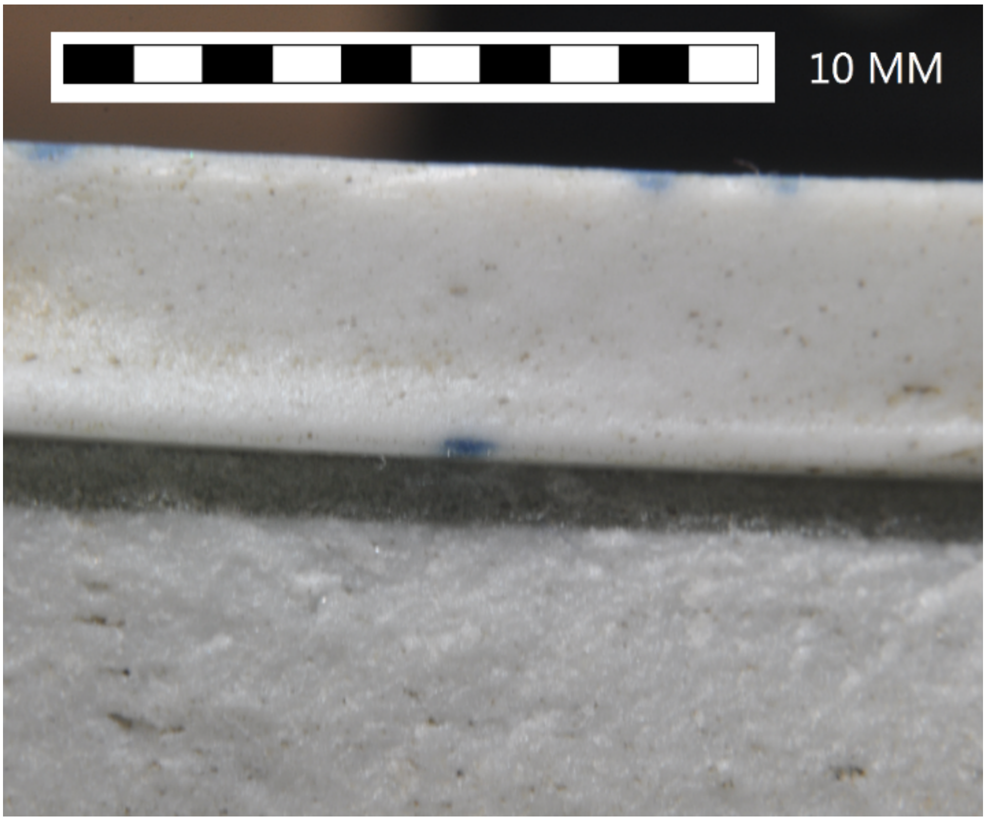


Figure 1.3: Ceramic fabric sections.

High quality stoneware body (lower part) and porcelain stoneware body (upper part) (photography by Ran Zhang)

(3) Porcelain

In this thesis 'porcelain' is used to refer to a ceramic body which is hard, dense, pure white and translucent (Figure 1.3: upper part), which is made by mixing kaolin clay with porcelain stone and is fired at a temperature of around 1,350℃ (Figure 1.4, Table 1.1) (Pierson 1996). But as mentioned above, the 'stoneware' and 'porcelain' have been called '*ci* (porcelain)' in Chinese, these definitions in archaeological missions are not clearly used particularly in English contexts. In this thesis, the ceramic classes including the Xing ware, Qingbai ware, Longquan ware, early Jingdezhen blue and white ware and some southern wares from Fujian and Guangdong can be called both 'stoneware' and 'porcelain', which are subjected to an open question of a scientific study, but it is out of the scope of this thesis.

Figure 1.4: Porcelain stone on the left and Kaolin clay on the right.

Porcelain stone, UCL Department of Geology Petrology Collection: P4238; Kaolinite, UCL Department of Geology Petrology Collection: 88:1(2), taken from Pierson (1996:17)

Table 1.1 Stages during firing
(Sources: Pierson 1996:56)

Temperature (℃)	Stages	Description
120	Water smoking	Water is remove as steam from clay.
350		Additional water and organic matter decomposed.
650	Ceramic change	Clay is no longer soft and becomes weak ceramic.
950	Low fired	Carbon matter is burned out and clay sinters to become earthenware.
1,100	High fired	Free silica is released turning clay to a stoneware body.
1,350		More silica in the clay is released and melts to render the porcelain body glassy.

CHAPTER 2: AN OVERVIEW OF CHINESE CERAMIC INDUSTRIAL PATTERNS FROM THE 6TH TO THE 16TH CENTURIES

2.1 Introduction

Despite certain problems, the broad historical outline of the development of Chinese ceramic production from the Tang period onwards is fairly well understood (cf. Medley 1974, Medley 1989, Kerr 1986, Vainker 1991, Harrison-Hall 2001, Kerr 2004, Feng 2009, Pierson 2009, Li et al. 2010b). But for the economic archaeologist or historian who is interested in making more detailed quantified comparisons between the occurrences of certain wares at certain sites, the situation is still frustratingly difficult. For example, if it were possible to show that the amount of Longquan celadon found on western Indian Ocean archaeological sites increased during the 15th century, one would wish to know if this were due to an increase in production in China or to a change in the pattern of trade. If it were possible to have clearer insight into production trends it might be possible to answer such a question. But in order to do this, it would be necessary to know how many kilns and kiln sites existed at any particular time, what their output was and how that changed through time. This is not possible now and it is unlikely that it ever will be, as so many kilns have been destroyed and lost. Nonetheless, as archaeological investigation and publication advances it should be possible slowly to gain a clearer picture of the development of certain industries and of the output of certain regions, as some work has already begun to show (cf. Mikami 1969, Guy 1986, Ma and Meng 1987, Ho 1994b, Sasaki 1994, Ho 2001, Karashima 2004, Yuba 2014). With this in mind, and with a clear awareness that the project is still premature, it was decided to attempt an overview and exploration of the published kiln data that is presently available in the hope that it might throw up some useful information which either confirms or contradicts the currently accepted view of trends in production. It is this task that forms the major aim of the present chapter. And before this can take place, an outline overview of the history of Chinese ceramic production is provided.

Within a single chapter it is not easy to outline the archaeological patterns of the Chinese ceramic stoneware and porcelain industry spanning over a thousand years from about the 8nd to the 16th centuries AD, yet an attempt at a general survey has become increasingly desirable as an understanding of the organisation and broader development of the ceramic industry is necessary to the creation of a coherent classification of trade ceramics. Many studies of Chinese ceramic history and archaeological investigations of ceramic kilns are published as individual case studies rather than broad overviews (Kerr 1986, Zhu 1998, Harrison-Hall 2001, Kerr et al. 2002, Pierson and McCausland 2003, cf. Kerr 2004, BJYSBWG 2011, Wang 2011b). At the same time, there are already many works that deal with Chinese ceramics over the long term (ZGGSYXH 1982, Medley 1989, He 1996, Quan and Meng 2008, Feng 2009, Pierson 2009, Li et al. 2010b, Fang 2013). Among them there is a recent example from the archaeological perspective by Quan Kuishan and Meng Yuanzhao (2008), who have undertaken a general introduction to Chinese ceramic kilns. They have produced a long-term and comprehensive overview of Chinese archaeological ceramic studies from the pre-historical periods to the Qing dynasty, reporting and describing key kiln sites. However, their presentation is limited to the study of their collected sources arranged by dynastic eras, without comparisons between periods. Their work does not offer an insight into the changing trends in Chinese ceramic production despite the massive collection of archaeological evidence.

This chapter will therefore attempt to build on their efforts by focusing on analysis of the changes in Chinese ceramic industrial patterns in order to provide the necessary background to the classification in Chapter 4, rather than attempting to provide a standard history of Chinese ceramics. Based on the datasets collected by the author incorporating over 140 published kiln sites excavated by Chinese archaeological missions and surveys, this chapter attempts to give an overview of the patterns of development of industrial ceramic production in order to provide a context and background for the classification presented in Chapter 4. The main aim of this chapter is a re-consideration and comprehensive understanding of Chinese ceramic manufacturers. It is argued that the patterns of development demonstrated by these kilns reflects to some degree, the expansion and reduction of the Chinese ceramic industry and the shift of major ceramic production from region to region, and kiln site to kiln site.

This chapter attempts as much as possible to take a quantified approach in order to try to provide an objective platform for comparison between regions and periods. It is recognised that this is problematic, given the incomplete nature of the dataset and the fact that many of the published reports do not provide quantitative data on excavated ceramics. Of course this limitation undermines to some extent attempts to understand the true patterns of the Chinese ceramic industry but nonetheless it is felt that there is now enough good published data to allow at least a preliminary attempt at a quantified overview that acknowledges the potential problems and inaccuracies but attempts at the same time to set out a working model that can be built upon, discussed and tested by future work. This chapter consists of four main sections:

(1) An outline review of the current understanding of Chinese ceramic history, which will not provide detailed information on individual ceramic kilns or classes but which attempts to give a general background to Chinese ceramics;

(2) A brief review of the historical records relating to the Chinese ceramic industry, which focuses on potential biases in these sources;

(3) A discussion of how reliable our current understanding of Chinese ceramic history gained through historical sources is without any quantified archaeological data to support it;

(4) An attempt to deal with this problem through the quantified analysis of the archaeological evidence collected by the author, together with a discussion of two main aspects of Chinese ceramic industrial patterns from the 6th to 16th centuries, namely:

(i) The distribution of Chinese ceramic kilns through time;

(ii) The key classes of Chinese ceramic productions and their development;

These discussions are directed towards an improved understanding of the trends in distribution and types of ceramics manufactured. These are key points for an understanding of Chinese trade ceramics and help to support the revised classification system for Chinese trade ceramics from the western Indian Ocean that is presented later in the thesis.

2.2 Outline historical review of Chinese ceramic manufacture

The current understanding of Chinese ceramic history was first established in the late 19th and early 20th centuries (Hobson 1925, Hobson et al. 1931, Ye 1934, Pope 1952)[2] and developed through the 20th century based on historical and archaeological studies, giving rise to the present academic view (Medley 1989, Ye 1989, Vainker 1991, Xiong 1993, He 1996, Wang 2004c, Feng 2009, Fang 2013). This section aims to provide a review of the current understanding of the development of Chinese ceramic history from the 6th to the 16th centuries. In order to provide a review of the archaeological and historical background to the classification created in Chapter 4, this section will introduce highlighted historical, aesthetic and archaeological studies concerning Chinese ceramic history and industries.

2.2.1 Chinese ceramics in the pre-Tang period (2nd to 6th centuries AD)

Chinese ceramics began with a pottery industry that can be traced back to the different Chinese Archaeological Cultures during the Neolithic period (approxi. 7500-1200 BC) (Medley 1989:17-28, Feng 2009:1, 12-31). It appears that the early potteries were constructed using simple clay fabrics and the birth of Chinese pottery late in comparison with pottery objects from other civilisations (Rice 1987:7, 13-14).

However, in the terms of high-fired ceramics, the birth of stoneware, or

[2]The early stage of Chinese ceramic art studied in the early 20th century involved the efforts of many collectors and scholars, such as Sir Percival David, R.L. Hobson, George Eumorfopoulos, and Walter Sedgwick amongst others.

proto-stoneware to be specific, was much earlier than the stoneware of other civilisations, and the earliest Chinese stoneware can be dated back to the Shang dynasty (about the 17^{th} to 11^{th} centuries BC) (Rice 1987:7, 15, Zhu 1989c, Kerr and Wood 2004, Shen 2009, Zheng 2009).

The term ‘proto-stoneware’ in China refers to high-fired pottery with a thin yellowish grey and unevenly applied glaze (Shen 2009:10). After a few hundred years of development, it is believed that the earliest true stoneware was successfully fired under the Eastern Han Dynasty (23-220 AD) (Ye 1989:68, Quan and Meng 2008:101-102, Feng 2009:238-239). This is also the time of the birth of true celadon in the Zhejiang Province of southern China, where the Yue and Deqing kilns were two important ceramic kiln sites that were producing celadon ware and black stoneware (Quan and Meng 2008:101, Feng 2009:243).

During the period from the Eastern Han to Sui dynasty (23-618 AD), the production of celadon and black ceramic ware was very common in southern China, where the ceramic industry was developing prosperously (Ye 1989:73). In contrast, in northern China the less-developed ceramic industry was attempting to produce white ceramics, which were more difficult to fire successfully. The birth of white ceramics in northern China was a consequence of the natural sources of ceramic clays, which contained lower amounts of iron and titanium oxides, rather than advanced kiln structures and firing techniques (Li 1998:149-151). However, until the Northern and Southern Dynasties period (420-589 AD), the white ceramics produced in northern China remained a form of stoneware-like pottery with a creamy white slip-glaze. A set of this type of white ceramics was found in the tomb of Fan Cui who died in 575 AD, and is regarded as the earliest Chinese ‘white stoneware’ (HNSBWG 1972, Feng 2009:284-285). But according to their fabrics of glaze and body and their firing temperature, they cannot be defined as the true white stoneware (Kobayashi 2009, Liu and Qian 2009). The date and circumstances of the birth of true white stoneware are still in debate.

2.2.2 Chinese ceramics in the Tang dynasty (618-906 AD)

The Tang dynasty arose during the 7th century and lasted until the early 10th century. The bequests of the Sui dynasty to the Tang dynasty were not only a unified China, but also their well-developed national facilities and political and administrative structures, including the Three Departments and Six Ministries system (五省六曹/三省六部制) and the Imperial Examination system (科举制), which improved and strengthened the central rule of the Tang Empire. Economically, the building of the Grand Canal improved trade and transport between northern and southern China (cf. Twitchett and Fairbank 2007, Lewis 2009). In terms of ceramic manufacturing, there were two centres that are important, both of which demonstrate significant improvements in ceramic fabrics and firing techniques during the 7th to 9th centuries (see '*Nan Qing Bei Bai*' below). An increased number of ceramic kilns were established across the whole of China and the ceramic industry rapidly expanded. The Tang period also witnessed the formation of 'ceramic brands' that reflect not only the improvement in the quality of ceramics, but also ceramic trading and the attributing of grades and values (Lu 1927:Chapter 4, Wang 2004c:28-29, Krahl et al. 2010:46).

(1) Tang ceramics in history records and ceramic ware ranks:

A large number of Chinese poems, monographs and historical books began to record, describe and compliment ceramic wares in the Tang dynasty. Poems from the pre-Tang period highlight that the ceramic wares were already used for drinking tea and wine, but these descriptions are very rare and rarely provide a detailed introduction and evaluation of ceramic wares and kilns before the 7th to 8th centuries.

The Tang Poems provide compliments to describe stoneware and celadon. *The Classics of Tea (茶经)*, the first monograph on tea written by a Tang tea master, Lu Yu (733-804), ranked Chinese stoneware and this is the first time in ceramic history that stoneware and pottery had been studied and ranked. According to Lu Yu, Yue celadon was regarded as the best tea drinking ware at that time, whilst Xing white stoneware/porcelain was also highly praised with the description: 'a kind of most popular ceramics with a fair price' given in a historical book called *A Supplementary*

History of Tang (唐国史补). Elsewhere, both the Yue and Xing kilns were recorded as producers of tribute ceramics (Wang 2004c:28-29).

Based on the Tang historical texts, it also can be seen that this was the first time that ceramics had been associated with good quality ceramic kiln names, which later became brand names, such as Yue kiln bowls, Xing kiln bowls, and Dingzhou kiln ware, Yuezhou, Shouzhou and Hongzhou kiln wares (越窑、邢窑、鼎州窑、岳州窑、寿州窑、洪州窑) (Lu 1927:Chapter 4, Krahl et al. 2010:46). The Dingzhou kiln site (鼎州窑址) is recorded in historical texts but has not been found during archaeological surveys.

Based on archaeological finds, some of the Yue and Xing wares were marked '*Guan'* (官 official) (Quan 1999a, Zhao and Zhang 2007:254), which may indicate that these were tribute wares for tax payment (Wang 2004c:44) to the Tang Chinese central court. '*Ying* (盈)' or '*Da Ying* (大盈)' marks are also present, suggesting that the tribute wares might belong to the storehouse of the central court for personal palace use (Hsieh 2010:174). The '*Jin Feng* (进奉)' mark directly and literally represents an item being 'offered in tribute' (Hsieh 2010:174). The term '*Gong Yao* (贡窑)' (Tribute Kilns) was found as an incised inscription on a Yue celadon cup-shaped burial jar in Cixi county of Zhejiang Province, and suggests that the concept of tribute kilns (wares) was formed in the late Tang dynasty (ZJSBWG 2000).

It should be noted that ceramics with '*Guan'* marks cannot be directly linked to tribute ware, and it has been suggested that such marks were mainly aimed at distinguishing the 'ware offered to the courts' and 'common wares'. Wares paid in tribute to the central court were produced according to the ceramic manufacturing regulations set by the central court (Wang 2004c:45). The kilns, which marked their ceramic products were sending ceramic tribute payments on behalf of local authorities to the central court. No standardised requirements or design patterns were issued by the central court to these kilns (Shen 2010:16).

(2) Two ceramic industrial centres:

In terms of the Chinese ceramic industry, it is well known that there were two ceramic manufacturing centres in the Tang dynasty (Feng 2009:326), where, bordering the Qinling Mountain-Huaihe River line, northern and southern Chinese ceramic centres were separately located in the lower parts of the Yellow River and the Long River. Fine quality stoneware with a full and even glaze covering a hard, high-fired body was produced in both northern and southern China in contrast to the pre-Tang period.

Celadon ware coming from the Yue kilns in Zhejiang and white stoneware fired in the Xing kilns in Hebei represent the highest quality ceramic wares of this period. Traditionally, this situation has been regarded as a ceramic industrial pattern termed '*Nan Qing Bei Bai* (南青北白)' and it is still used by Chinese archaeologists and ceramicists when describing Tang Chinese ceramic history. This term refers to the fact that there were two ceramic firing complexes: a southern Chinese ceramic industry centred in Zhejiang producing celadon, and a northern Chinese ceramic industry led by the Xing kilns that was mainly producing white ceramics (Quan and Meng 2008:135, Feng 2009:326) (see 2.5.1 below for more discussion).

(3) Popularity of stonewares

Archaeological evidence may suggest that stoneware became popular in tombs as burial objects. Huang Yijun has provided statistical analysis on the percentage of stoneware-burial objects (excluding high fired pottery wares such as Sancai and green-splashed wares) in northern Tang China from the 7th to 9th century, mainly based on tomb-excavations at the Xingyuan Tang tomb sites at Yanshi City (偃师杏园唐墓) (HNSWWKGYJS 2001). She proposes that whilst stoneware-burial objects cannot be found in the 7th century in the Xingyuan tombs, recovery of such objects gradually increases from about 3%-16% in the 8th century to about 22% in the 9th century (Huang 2006b:82). She further argues that following the popularity of stoneware-burial objects in the Xingyuan tombs, white stoneware became common and recovery of these objects increases from about 20% in the early 8th century to about 80% in the 9th century, while high-fired burial potted figures and wares sharply decreases (Huang 2006b:82). The limitations of Huang's work are clear, as she does not consider the influence of factors such as social class, rank and the personal taste of tomb owners, as the burial objects cannot be evenly distributed across the tombs, in addition there is unreliable information available for some tombs which may have been destroyed, illegally dug or are poorly dated. However, Huang's research provides an indication that stoneware ceramics became popular in the 8th and 9th centuries and white stoneware was regarded as an important burial object during the 9th century.

Yu Wenrong shares a similar opinion that white ceramics became much more popular in 9th century northern China. He has argued that this phenomenon was closely linked to the Chinese ceramic industrial pattern in northern China, where at that time white stonewareware could be widely produced (Yu 2002). But the distribution of white stoneware in southern China was limited to large-scale cities, such as Changsha, Yangzhou and Guilin (Li 1997, Li et al. 1997, Li and Zhu 1997, Huang 2006b:82).

(4) Polychrome wares

Polychrome ware was manufactured at sites in both north and south China, and the Gongxian kilns and the Changsha kilns are two well-known examples which manufactured advanced, good quality polychrome ware (Feng 2009:348-350).

The Gongyi kilns were known for producing white stoneware and celadon since the Sui period. However, during the time of the Tang dynasty they became Sancai and green-splash ware suppliers, and although white stoneware was still being made it was much lower in quality in comparison with the white stoneware from the Xing kilns (Feng and Li 2005b). Sancai ware was a form of high-fired pottery with a low fired lead glaze, and is regarded as lower quality than hard and dense-bodied stoneware, very often used as tomb furniture. The colourful glaze on Sancai ware was due to metal oxides, such as iron, copper and cobalt, as colour agents that were freely applied onto the biscuit fired body. It appear that Sancai ceramics were manufactured at kilns other than the Gongxian kilns, because similar pottery has been found at kilns in northern China, such as in Henan, Hebei and probably also Shaanxi (Feng 2009:348-350).

In southern China polychrome underglaze-painted wares were made in the Changsha kilns, also named the Tongguan kilns. These items possess colourful calligraphic decoration that is painted under a transparent and lustrous glaze; the motifs are free and mostly formed using organic patterns, such as leaves, animals, flowers, landscapes, birds, fish and so forth. Changsha bowls were popular in both overseas markets and in China itself. The Changsha kilns were located in Changsha city in Hunan Province, and production started during the Tang dynasty and had ended by the 10th century, although a more precise dating of production at the Changsha kilns remains unclear. Unlike the well-described Xing and Yue wares, there is very little historical writing about this production process (Huang 2006a:51-53, Feng 2009:338-341).

It is thought that both Sancai and Changsha wares were strongly influenced by foreign ceramic production from western Asian regions in the post-Sasanian and early Islamic periods (Vainker 1991:63), but as yet there is no clear answer regarding which influenced which. The colourful decoration of Sancai ware was achieved by adding metal oxides; but as no source of cobalt, which was used for blue colouration, has yet been discovered in China, this suggests that it was probably imported from Persia where cobalt mining sites have been documented (Vainker 1991:76, Hallett 2010:79). In some cases, these polychrome wares have been regarded as specifically designed for foreign markets, due to the decorative Arabic inscriptions found on some vessels (CSYBJWYH 2004:138).

2.2.3 Chinese ceramics in the Five Dynasties period (907-960 AD)

Politically, more than a half of the 10th century was an era of turmoil. Tang China, which ended in 907 AD, was one of the highest ranked empires in Chinese history and the country was subsequently divided among regional governors, commanders and warlords into ‘the Five Dynasties and Ten States’ (五代十国) period. China then experienced nearly 60 years of changing dynasties within central China and ten separate major states in southern China. This resulted in a period of political chaos, social instability and economic decline, with many attempts made to re-unify China by each dynasty or to legitimise their own rule by the ten states.

However, it should be noted that although there was an economic decline, the development of techniques and manufacturing processes did not reduce. Joseph Needham (Needham 1954:130-131) raises an interesting point, which is that printing techniques took great steps forward at this time - although this single case observation cannot represent all the techniques or manufacturing as thriving or improving in the 10th century, as there must have been an economic decrease due to the near constant warfare. However, it should be noted that the economic pattern during this tumultuous period was not totally reduced, and in the terms of the ceramic industry, both a decline and improvement are visible from the archaeological evidence (Feng 2009:351-352, 359-360).

In the 10th century, the Chinese ceramic industry had seen many changes. In Hebei Province, it has been suggested that the Xing kilns declined and warring northern China resulted in terrible damage to the development of manufacturing industry. During the period 883 to 950 AD, there were 28 wars within the modern Hebei Province, which reduced the scale of production at the Xing kilns. Here based on archaeological research, it is evident that the number of kilns decreased (Figure 2.1) (Yang and Zhao 1993:34-36).

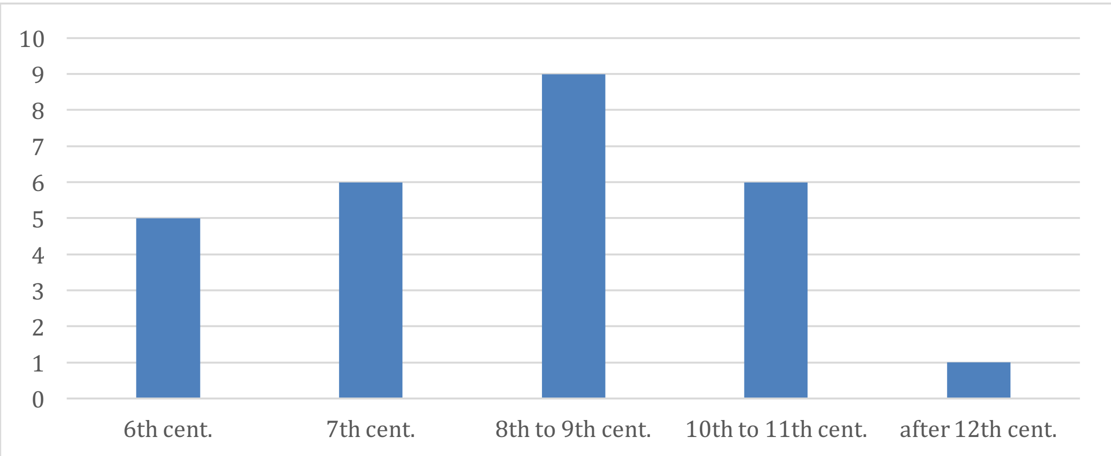


Figure 2.1: The number of kilns at Xing from the 6th to 12th century AD.
Based on Yang and Zhao's research (Yang and Zhao 1993:34).

However, it has also been suggested that war and turmoil were not always the main reason for a decrease in the ceramic industry, and the decline of the Xing kilns was not only due to the civil war in northern China. Unlike the Xing kilns, their imitators and neighbours, the Ding kilns, did not perish as a result of the wars during the 10th century. Yang Wenshan and Zhao Hongsheng highlight that the decrease in the Xing kilns is likely to be because the Xing kilns had run out of stoneware clay, which reduced the yield of high quality white stoneware. Therefore, wars and a period of turmoil were just one of the reasons for the Xing kilns decline (Yang and Zhao 1993:36).

In southern China the Changsha kilns provide a similar example, as they also declined during this period because of the dual effect of the Huangchao Rebellion (875 AD) and an unsupportive local authority, the ruling family of the Southern Chu dynasty (one period of the Five Dynasties, 907-951 AD), who were established in the modern Hunan Province and waged a civil war and conducted a massacre in Changsha City (948 AD) (Gu 1993, Zhang and CHen 2004:182).

Other kilns which declined include the Shouzhou and Hongzhou kilns, which were highly ranked kilns during the Tang period (Yu 1984, Hu 1988). According to the archaeological evidence, their decline was due to lack of resources and old-fashioned production. Their heyday can be dated back to the 8th century and their decline started in the 9th century and continued into the 10th (Yu 1984:97-98, Hu 1988:749).

Whilst some kilns which were important during the Tang period declined, such as the Xing, Ding and Changsha kilns, others, such as the Yue kilns, seem to have increased their production. The Yue kilns continued to play an important role during the Five Dynasties period, when their products were used for both tribute payments and export trading. It has been argued that the Yue kilns steadily developed during the Five Dynasties period because the local king of Wu-Yue (modern Zhejiang area) was fond of celadon and used Yue celadon to pay tributes to neighbouring kingdoms in order to show his respect and loyalty. His supportive policy for the local ceramic industry ensured that the Yue kilns developed steadily during this period of turmoil (ZJSKWWKGYJS et al. 2002:371). This development can be seen in the archaeological evidence, where steady growth in the terms of the scale of the Yue ceramic industry during the 10th century has been confirmed by the current archaeological excavations at the Yue Silongkou kiln sites (ZJSKWWKGYJS et al. 2002:347, 350). In terms of the Yue celadon trading, from the archaeological excavations in the Ningbo port there is a continual exporting pattern without any decline (Lin 2005a:181, 2005b:116, 127). Moreover, according to three eastern Indian Ocean shipwrecks, the Belitung shipwreck, Intan shipwreck and the Cirebon shipwrecks, it is apparent that the quantity and percentage of exported Yue celadon ware sharply increased (Flecker 2001, 2002, Munoz 2006, Liebner 2007, Qin and Gu 2007, Tirtamarta 2007, Shen 2008, Qin 2008, Krahl et al. 2010).

In terms of Guangdong and Fujian provinces, historical records show an economic boom during the Five Dynasties period, due to the open and warm-welcome foreign trade policy set by the local authority of the Min Kingdom in Fujian and the Nanhai Kingdom in Guangdong. These historical records, for example, show that the Min Kingdom paid the Liang Dynasty in Zhejiang a great tribute, which included gems, ivory, seafood, ceramics and incense in 908 AD (Xue 1997:The History of Liang Vol. 4). Many of these trade items were not produced locally but were the result of maritime trade in ceramic wares (Zeng 2001:153). A review suggests that rare kiln sites dating back to the 10th century in Guangdong are supported by current archaeological evidence, and ceramic finds in Guangdong tombs and palace remains are common (Yi 2013:14-18). However, there is not a clear pattern to show, based on this recorded economic boom, that Fujian and Guangdong had well-developed ceramic industries, although ceramic productions were major trade commodities (Zeng 2001:153, Yi 2013:19). The fact that there are only two highlighted archaeological excavations of Fujian kilns and the unclear numbers of Guangdong kilns (Zeng 1985, FJSBWG 1994, 1996, Zeng 2001:154-155) suggest that there was no economic boom of the ceramic industry at that time. This unclear understanding is due to a lack of archaeological research.

2.2.4 Chinese ceramics in the Northern Song period (960-1127 AD)

The Song Dynasty reunified China in 960 AD, but the process took nearly 20 years.

In 978 AD the last state in southern China, the Wu-Yue Kingdom, yielded its land and paid allegiance to the Song Dynasty. In the following year, the Song Emperor, Zhao Kuangyin, conquered the Bei Han state located in northwest China, and under the rule of the Song Dynasty, the Chinese capital was shifted from Chang'an city in Shaanxi Province to Kaifeng city in Henan, northern China. Before the Song court lost the northern Chinese lands, the Song Empire has historically been called the Northern Song dynasty because of the northern location of its capital.

It has been suggested by historians that due to the warfare and destruction of people's livelihoods, economic recovery was near the top of the priorities for the new Song ruling elites (Twitchett and Smith 2009:171). From an archaeological view of the ceramic industry, especially during the 11th century, it can be seen that the ceramic industry entered a flourishing era.

Four main achievements in ceramic firing techniques occurred during the 11th and 12th centuries; each of them strongly influenced not only the appearance of ceramic wares at that time, but also the ceramic development in the following periods.

The first improvement was in the firing of celadon ware (Kerr 2004:Chapters 2, 4, 7). Both southern and northern celadon kilns had reached a new level in terms of glaze fabrics. The green colour on high quality celadon ware from tribute kilns, such as the Ru kilns and Yaozhou kilns in the north and the Yue kilns in the south, became well-controlled. However, distinguishing features between the kilns can be identified: Yaozhou celadon ware has a glassy and olive green glaze with full moulding and incised decorations (SXSKGYJS and YZYBWG 1998), Yue celadon ware has a thin but well-controlled layer of green, whereas objects produced by the Ru kilns have a jade-like, thick and bluish green glaze with tiny, transparent crackle. Rare decorations on the body can be found and their shapes are elegant, and this fashion strongly influenced celadon firing in the following period (Harrison-Hall and Krahl 2009:24-28). The firing techniques continued to follow the old traditions from the 10th century (ZJSKWWKGYJS et al. 2002:362), although it has been argued that Yue celadon ware was strongly influenced by the Yaozhou kilns in terms of decoration (Quan 2003:52-55). In general, the variation in celadon ware demonstrates that celadon manufacturing techniques had improved.

The second improvement is the invention of the '*Fu Shao* (覆烧)' firing technique. In the 11th and 12th centuries, some ceramic wares had an unglazed rim but a fully glazed foot, which was thin and low; this was due to the firing technique invented by the Ding kilns. The Ding kilns were in competition with the Xing kilns during the Five Dynasties period, and the Ding kilns imitated the high quality Xing white stoneware/porcelain, and increased production of high fired white stoneware/porcelain due to abundant stoneware-clay resources (Lin 1965:394). This high level of productivity was enabled as a result of a new ceramic firing process, called reversal setting firing, which made considerable savings in saggar space and increased yields four-fold compared to when separate saggar firings were required (Lin 1965:394, Liu 1974:390). Originally, a set of reversed wares were placed on a plate-setter (Figure 2.2: left) and all the wares had an unglazed rim called 'Mang Kou' (芒口) which allowed them not to touch the setter. However, the drawback of this method was clear, as it required a set of wares of certain sizes which were suitable for the setter, thus limiting the shapes and sizes of the ceramics produced. The improved reversal setting firing method fixed this problem by placing reversed wares on a numbers of same-sized ring-shaped supporters and stacking them together, so that each also had an unglazed rim to protect it from touching the support (Figure 2.2: right). This improved method only required same-sized wares, which was much easier for forming and firing. Because of the unglazed rims, the vast majority of the good quality Ding white bowls and plates needed a copper or silver band both for decorative purposes and for smoothing the rough edges (Figure 2.3) (Liu 1974:392-393, Harrison-Hall et al. 1997:182-187, Kerr 2004:45).

The reversal setting firing method was copied from northern China to the south, and the Jingdezhen kilns imitated this method during the Northern Song dynasty (Liu 1974:390), whilst also being influenced by Ding ceramics. They created Qingbai ware, which was another important achievement of the Song dynasty (Liu and Bai 1980, Guo 2006:67, JXSWWKGYJS and JDZMYBWG 2007:448-449).

The third improvement was the development and successful firing of Qingbai ware that mainly came from the Jingdezhen Hutian kiln sites (Figure 2.4) (Kerr 2004:Chapter 8). This site is located in the Hutian Village near Jingdezhen City in Jiangxi Province. Initial production from this site was celadon and white stoneware during the period of the Five Dynasties. During the Song dynasty, the Hutian kilns were famous for their Qingbai ceramics, which literally means 'bluish-white glazed' ware; these combined celadon and white ceramics, and normally had a smooth and pure body coated with a cool blue glaze. Qingbai ware also imitated the moulded and carved decorations of Ding ware and the decorative patterns normally employed were in the form of floral designs and children playing. Qingbai ware imitators were widespread across southern China, and included the Jiangxi, Fujian, Guangdong, Guangxi, Hubei, and Hunan kilns (Vainker 1991:95-99, Feng 2009:403-405).

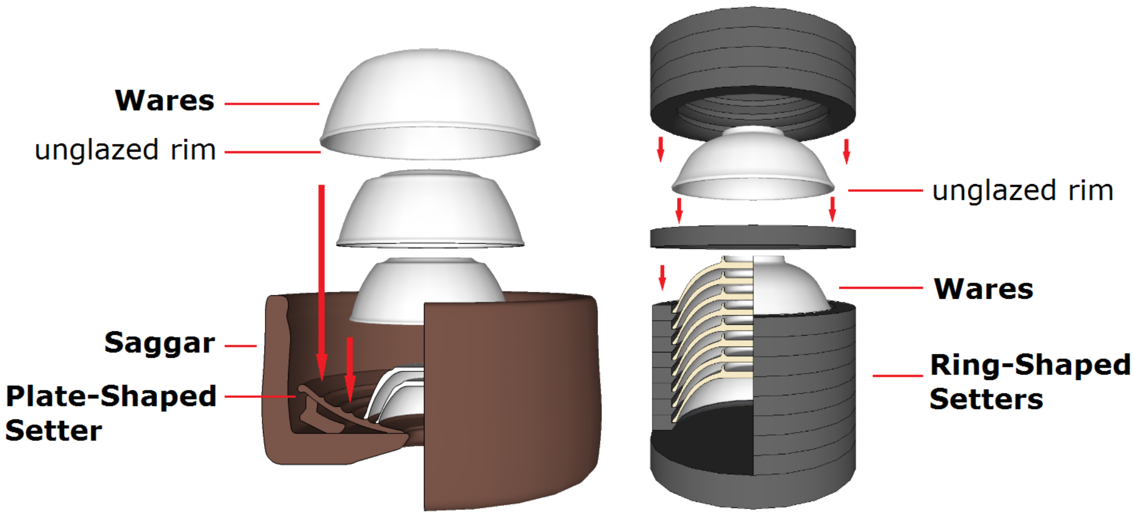


Figure 2.2: Sketch of the reversal setting firing process.

(Drawing by Ran Zhang)

Figure 2.3: White Ding bowls with metal bands.

(Height: 129mm and 68mm, from the Percival David Foundation collection, SOAS)

The fourth improvement was in black ware, which was widely manufactured in both southern and northern China, with very famous black ware produced in the Jian kilns of Fujian Province, Jizhou Kilns in Jiangxi Province and the Cizhou kilns of Hebei Province (Kerr 2004:Chapters 5, 6, 9). Among them, the Jian kilns were famed for producing 'hare's fur' tea bowls, which had a finely marked rust colour on the black glaze. 'Hare's fur' is a description of the metal-like spots spreading on the glaze, which looks like the fur of hares (Li 1998:189-196).

Figure 2.4: A Jingdezhen Qingbai ewer.

(Height: 202.3mm, from the British Museum collection)

2.2.5 Chinese ceramics in the Southern Song period (1127-1274 AD)

Throughout the period from the 11th to 12th century, Song China faced a military threat from northern nomadic nations, such as the Liao (Khitan) and Jin (Jurchen). After losing the capital, Kaifeng City and the northern Chinese territory in 1127 AD, the Song court had to move to Lin'an City (present-day Hangzhou) where it established the Southern Song dynasty, which could be defended from further attacks by Jin armies through the natural barrier of the Long River.

Due to the loss of northern China, the territory north of the Huai River, the Song government revenue and agricultural supplement, was partly cut off or lost altogether.

This can be demonstrated by the change in population, which according to Qi's study, witnessed a decrease in the number of households during the 12th and 13th centuries, mainly due to losing the northern Chinese territory. A steady increase in the number of households is an indicator of agricultural and economic development, which to some extent reflects the economic change which occurred during the Southern Song dynasty as southern China developed. However, it has been noted that the number of households in Fujian and Zhejiang rose to nearly a half million, and in Jiangxi to nearly one million (Qi 1987:53-54). These increases may be due to the southward migration of northern Chinese and the relatively peaceful lifestyle of southern China. Therefore, the change in number and distribution of households indicates a change in the Chinese population during the 10th to 13th centuries, which could partly reflect a change in the labour source and an economic boom (Qi 1987:53-54). These population changes are also reflected in the production of ceramics as there was a boom and changes to the southern Chinese ceramic industry according to the archaeological evidence.

Ceramic kilns in lost northern China were mostly ruled by the Jurchen dynasty. These kilns were not linked to the export/maritime trade ceramics like those in the southern Song dynasty (see explanation in next chapter) and hence a detailed discussion and description will not be provided here. However, it should be noted that original producers of good quality ceramics, such as the Ru, Yaozhou, Jun (KN. 47) and Ding kilns experienced a decline or altered their ceramic production in line with the rule of alien authorities (Lin 1965, HNSBWG 1975, HNSWWYJS 1992, SXSKGYJS and YZYBWG 1998). At the same time, it is hard to state that there was a reduction in the northern Chinese ceramic industry, rather the multiple-type ware based industry was enlarged following the break-up of the celadon based industry during the Northern Song period. This change was a result of the strong influence of Cizhou type ware, which had been produced in large quantities within the provinces of Henan and Hebei, as well as red and green enamelled ware, as a new type invented in this period, commonly produced in the provinces of Henan, Shanxi and Shandong.

In southern China the first important change was a decline of the Yue celadon kilns.

In terms of ceramic quality, excavations at the Silongkou kiln sites have yielded rough quality celadon wares which date to the late 11th century and continue to occur into the 12th century. Although good quality celadon ware still required firing in the early 12th century, these products were occasional and limited to paying tribute to the Southern Song court (ZJSKWWKGYJS et al. 2002:348-349).

Quan Kuishan studied the decline of the Yue kilns and suggests that according to all the Yue kiln sites, the scale of ceramic production declined from the late 11th century onwards. He explains this decline through an interesting analysis based upon archaeological and historical information (Quan 2003:50), noting that the decline of the Yue kilns was because of a failed marketing strategy resulting in the dominance of other major kilns. During the middle and late Northern Song period, the Yue kilns started to imitate decorative designs and methods for fully carved and moulded Jingdezhen Qingbai stoneware and Yaozhou celadon. After losing their advantage concerning the appearance of a glaze with a non-decorative style, the Yue kilns gradually declined (Quan 2003:49-50; 54-55). Based on the findings from the Silongkou Yue kiln sites, a massive amount of celadon was produced with carved and moulded decorations, which can be dated to the northern dynasties period (ZJSKWWKGYJS et al. 2002:362-366).

Quan Kuishan suggests that the Yue kilns changed their key ceramic firing techniques from a jade-like glaze to carved decorations, which significantly increased the celadon manufacturing costs and began imitating the products of other kilns. It has been argued that this change meant that Yue celadon did not maintain its original advantages of simple beauty based on a monochrome green glaze and elegant shapes. Therefore, the high position of the Yue kilns within the ceramic market was difficult to hold onto (Quan 2003:49-50). During the late Northern Song period, the Yue kiln potters wanted to regain their market reputation by once more re-creating the jade-like green glaze, but it has been suggested that this decision was taken too long after they had begun imitating the styles of other kilns. During the Southern Song dynasty, the Yue potters again wanted to re-focus on glaze and shape, but other celadon kilns, such as the Guan kilns and Longquan kilns, had already improved celadon glaze fabrics.

Even despite the support of the Song central authority, the Yue kilns perished during the early part of the Southern Song dynasty (Quan 2003:52-55).

A second change also occurred in Zhejiang Province: while the Yue kilns declined, the Guan and Longquan kilns' production rose. The Guan kilns, literally the 'official kilns', were probably funded by the Southern Song court to replace the tribute productions paid using Ru ware during the Northern Song period (Wang 2004c:68). From archaeological evidence, the well-made bricks used for building the Guan kilns were unique within kiln-structures of the Southern Song period and even before this time (Du 2002:2-3). The kiln sites seem to have been specially designed and the unearthed celadon wares are similar to Ru celadon ware which date to the Northern Song period (Wang 2004c:68). The Longquan kilns were probably influenced by both the Ru and Guan kilns, and entered their heyday for producing good quality celadon ware early in the 13th century, with the number of kilns and the scale of production steadily increasing (Qin and Liu 2012:7-8). Although mostly producing good quality celadon ware with a white, hard and pure body, these kilns also made a limited amount of black, thin, hard, and relatively rough celadon (Zhu 1989a:66, Qin and Liu 2012:9-10). Black body celadon ware imitated Guan celadon ware in terms of shape and decoration, which could indicate that the black body celadon ware of the Longquan kilns was also a form of tribute ware for the Southern Song court (Shen 2010:23).

The third change can be found within Fujian Province, where there was a ceramic industrial boom in the 12th to 13th centuries. When the Song capital moved to Lin'an revenue and income mainly relied on the export trade; Quanzhou presented a geographical advantage to Lin'an as it is much closer than the port of Guangzhou (Tong 1980:60-61). Therefore, the re-establishment of the Mercantile Shipping Superintendence began in Quanzhou port in the early 12th century, and it gradually became a more important port than Guangzhou (Yang 2009). Based on this historical background, the Fujian Province, especially the *Minnan* area (闽南地区), became a ceramic centre due to Quanzhou port (Lin 1965:390). The ceramic industry in Guangdong sharply declined, whilst the kilns in Jiangxi Province, famous for producing Qingbai stoneware, flourished as they were also heavily involved in the export market.

2.2.6 Chinese ceramics in the Yuan dynasty (1274-1368 AD)

Kublai Khan, a Mongolian emperor, conquered the Song China in 1279 AD after occupying the Jurchen Jin dynasty in 1234 AD. He not only reunified China but also extended the Mongol Empire. By 1294 AD and after the death of Kublai Khan, the Mongol Empire was divided into four separate khanates and Yuan China: the Golden Horde khanate in the northwest; Chagatai Khanate in the west; Ilkhanate in the southwest; the short-lived House of Ögedei in present-day Xinjing of China; and the Yuan dynasty which was located in the lands of Song China (Franke and Twitchett 1994:413).

Yuan China established a capital in Dadu (present-day Beijing) in northern China, where the economic environment had been destroyed by the wars that continually occurred during the 13th century. The economic centre of China was located in southern China, which supplied northern China and the Yuan dynasty through the Grand Canal that had been built during the Sui dynasty (Qi 1999:476).

According to both the historical/aesthetical approach and the excavated ceramic findings from Yuan Chinese ceramic kilns, the quality of the ceramics produced was much lower than in the Song period. Higher quality wares became larger and heavier in size; plates with a diameter of 30 to 60 cm, bowls with a diameter of 25 to 40 cm and vases over 50 cm high have all been found. Ceramic objects of the Yuan period are generally regarded as ugly and of indifferent quality (JXSWWKGYJS and JDZMYBWG 2007, Harrison-Hall and Krahl 2009:50. 52, ZJSWWKGYJS et al. 2009). However, the quality of ceramic fabrics did not decline under the Yuan dynasty and in terms of the ceramic firing techniques, there were many new technical achievements (Medley 1974:1) and five major improvements.

(1) Porcelain fabrics

It has been suggested that the Xing kilns during the Sui and Tang dynasties produced the earliest high fired porcelain-like white stoneware, which is regarded as porcelain by researchers of Chinese ceramic archaeology (Zhao and Zhang 2007:19-20). However, porcelain production can be vastly during the Yuan dynasty at the Jingdezhen kilns, using Kaolin clay which improved the quality of the ceramics produced. Kaolin clay is rich in Al_2O_3 and the level of iron compounds is very low (Li 1978b). A porcelain body is pure white, smooth and extremely hard, and it is resistant to abrasion using a steel instrument, such as a knife or file (Fisher 1989:1). No inclusions can be seen with the naked eye when examining the cross-section of a new broken sherd.

(2) Underglazed cobalt blue

Underglazed cobalt blue painting was applied in the Gongxian kilns during the late Tang period (HNSWWKGYJS and ZGWHYCYJY 2011). However, widespread use of cobalt blue occurred in Yuan China in the Jingdezhen kilns. It can be seen in a sudden rise of blue and white porcelains in the Yuan dynasty, which had been fully decorated and carefully painted (JXSWWKGYJS and JDZMYBWG 2007) (Figure 2.5: Jingdezhen Vase).

(3) Longquan biscuit firing techniques

Longquan potters mastered kiln-atmosphere control and used two types of atmosphere, oxidation and reduction, to produce celadon ware, which could be made by firing ceramics in a smoky atmosphere but cooling and finishing the process in an oxidation atmosphere. This was used to produce Longquan celadon for the Yuan dynasty; in this type of celadon the glaze is green but the exposed body is red (Pierson 1996:58) (Figure 2.5: Longquan vase).

(4) Shufu glaze

During the 13th century, Shufu glaze, a type of glaze very similar to Qingbai but with a lower percentage of calcium flux, was used for glazing Qingbai porcelain in the Jingdezhen kilns. Because of the reduced flux, Shufu glaze had a higher viscosity and was easier to apply to on objects, with the fired glaze appearing rather opaque, milky and thicker than Qingbai glaze (Pierson 1996:20-21).

(5) Popularity of 'the full decorative style'

Many kilns, such as the Cizhou, Jingdezhen, Jizhou and Longquan kilns, produced fully decorated ceramic wares that were very popular in Yuan China (Figure 2.5) (Medley 1974, JXSWWGZD 1984a, JXSWWKGYJS and JDZMYBWG 2007, ZJSWWKGYJS et al. 2009). This style was not very common during the Song period and can be found on Yaozhou, Cizhou and Jingdezhen wares. The highly ranked Longquan, Ru and Guan wares were famed for their elegant shape and beautiful glaze, rather than decoration; however, a change in decorative fashion occurred and it is difficult to fathom the social and historical reasons for this. It has been suggested that the fully decorative style may have been strongly influenced by Islamic art tastes (Medley 1974:32-33, Krahl 1986d).

Figure 2.5: Full decorative style on ceramics in Yuan Dynasty.

(From left to right: Cizhou, Jizhou, Jingdezhen and Longquan ceramic vases, height: 240mm, 151mm, 394mm and 243mm, housed in the British Museum and the Percival David Foundation collection, SOAS)

2.2.7 Chinese ceramics in the Ming dynasty *(1368-1644 AD)*

In 1368 AD the first Ming emperor, Zhu Yuanzhang, also called the Hongwu Emperor, re-established Chinese authority and spent 35 years reunifying China from the rule of the Yuan, an alien empire (Zhu 2000:209).

Due to the constant warfare in the late Yuan period, the Chinese economy, especially in northern China, such as in the provinces of Hebei, Henan and Shandong, had been badly destroyed; however, during the early years of Hongwu's reign the economy recovered smoothly (Zhu 2000:251-254). The Hongwu Emperor, in terms of political control, expected everyone to obey his rule and he implemented consolidating control in China by creating a new administrative system and new legal code (Zhu 2000:236-240).

During the first few decades under Hongwu's reign, the Ming dynasty employed a carefully diplomatic attitude to foreign countries and closed the gates to foreign exchange. The Hongwu Emperor warned future emperors not to engage in military campaigns for glory and conquest, and in his 1395 AD ancestral injunctions, Hongwu specifically wrote that China should not attack neighbouring countries (Mote and Twitchett 1988:229). In terms of foreign trade, the Hongwu Emperor attempted many times to open China and he initially established the Mercantile Shipping Superintendence in the port of Taicang near the Ming capital Nanjing, before moving the office to Ningbo, Quanzhou and Guangzhou. In 1374 AD he finally closed China (Chao 2012:72-73) and admonished future Ming rulers that 'no ships be allowed into the sea' (片板不许下海) (Zhang 1974:vol. 250). This 'sea ban' was also aimed at ensuring land security.

The son of Hongwu, the Yongle Emperor, slightly altered the 'sea ban' but he still prevented private trade (Chao 2012:76) and attempted to monopolise foreign tributes and trade through Zheng He's expeditions and tribute trade (Kerr 2002:125, Park 2012:169).

In the Ming dynasty, a notable change in the Chinese ceramic industry is the establishment of the Imperial Ceramic Kilns (御窑厂) in Jingdezhen and Longquan cities for producing ceramics that only used by Ming Chinese emperors (Wang 2011c), while the northern Chinese ceramic industries had sharply declined. It has been suggested by Quan Kuishan and Meng Shaoyuan that production in a large number of kilns that had been operating in the Song-Yuan period declined or stopped and only the Jingdezhen, Longquan and Dehua kilns maintained their leading positions without any further development (Quan and Meng 2008:219).

This view is supported by archaeological evidence from available kiln sites. The northern Chinese ceramic industry declined sharply and high quality ceramic wares were no longer produced there. Most of the ceramics in this area in this period were common stoneware or high-fired pottery (Yang 1964, ZZSWWGLZ 1984:382-383, Xue and Zuo 2002, Guo 2005, Lv 2013).

In southern China, both the Jingdezhen kilns and Longquan kilns continued as the leading kilns and became the ceramic centres for the whole of China. The so-called Imperial Ceramic Kilns had been officially established in Jingdezhen in 1426 AD (Wang 2004c:126-127, 2011c). Potentially slightly earlier than this, the Longquan kilns had been asked to produce imperial quality celadon ware and this might have lasted into the middle Ming period (ZJSWWKGYJS et al. 2009, Qin and Liu 2012:14-15). Both Fujian and Guangdong had a good ceramic industry during the Ming dynasty and the Dehua kilns were famous for their white porcelain (FJSBWG 1990a, FJSBWY et al. 2006).

The archaeological evidence indicates that there was a clear reduction in the number of ceramic kilns during the Ming dynasty, especially in northern China where the ceramic industry declined sharply (Quan and Meng 2008:219-220). However, this decline does not represent a decline of the whole Chinese ceramic industry nor the quality of ceramics produced. Rather it shows that the centre of Chinese ceramic manufacturing became centralised at the Jingdezhen and Longquan kilns as mentioned above. Fujian and Guangdong also had a good ceramic industry, especially as exporting ceramic suppliers, and closely followed the ceramic fashions and trends of the imperial quality ceramic producers. Blue and white porcelain became the major ceramic ware produced in Ming China.

2.2.8 Summary for this historical review of Chinese ceramic development

Based on this historical review of the Chinese ceramic industry, it can be seen that China could produce good quality and high-fired ceramic stoneware from the 6th century onwards. With technical improvements in ceramic manufacturing methods, ceramic wares in China had been highly regarded as not only cups for the tea-ceremony (Lu 1927:Chapter 4, Krahl et al. 2010:46), but also tribute wares for the Tang central palace and court (Wang 2004c:28-29) from the 8th century. These good quality ceramics were therefore giving a new impetus to the oriental trade in addition to the trades in silk and spices.

In the following centuries, Chinese ceramic wares contributed to China's prosperity and became the imperial wares for the Chinese Palace and Emperors in the early 15th century. During this long period, of course the classes of Chinese ceramics changed from time to time. These ceramic products are useful for the study of Indian Ocean archaeology: they survive well, can be easily identified and can often be more precisely dated than local wares in the western Indian Ocean. This background, therefore, provides an outlined impression of Chinese ceramics and ceramic industries for the following sections and chapters.

2.3 Chinese historical records on ceramic industries

Of course historical texts are a key source for our understanding of the Chinese ceramic industry and its development and many studies have been carried out using these sources, particularly on individual periods or aspects of the manufacturing industry. However, if we wish to take a broad overview of the long-term development of ceramic manufacturing, the picture becomes more complicated. Very few studies have attempted to take this type of long-term perspective using historical sources in a way that would allow period-by-period comparisons to be made. This is because it would be a massive task to collect all the historical accounts that relate to Chinese ceramics over such a long period of time (Chen 2009:93). In the absence of such a study and bearing in mind the limitations of a PhD thesis and the fact that this thesis is based predominantly on archaeological evidence, the historical data presented in this section is drawn from two important contemporary works on the collection of historical documents concerned with ancient Chinese ceramics: *Annotated Collection of Historical Documents on Ancient Chinese Ceramics* (中国古陶瓷文献集释) by Feng Xianming (2000) and *Zhongguo Taoci Guji Jicheng* (中国陶瓷古籍集成) [the Collection of Historical Documents on Chinese Ceramics] by Xiong Liao (2006b). This section cannot therefore claim to be a full and detailed study of the historical sources that is something that we must hope will be produced in the future.

Feng Xianming and Xiong Liao have separately collected and annotated many ancient Chinese ceramic histories and their interpretation provides a detailed explanation of these historical accounts, word for word. During the course of their research, they have not only collected as many historical accounts as possible, but also through their historical understanding, have provided detailed information on Chinese ceramics, kilns, ware shapes, historical comments and ranking, manufacturing techniques and so forth (Feng 2000, Xiong 2006b). Whilst small editing errors and missing and repeated accounts may be occasionally found, and there is generally an absence of consideration of the reliability and historiography of the documents used, the contribution of these books far outweighs their flaws (Chen 2009:93, 97). A re-reading of the historical records collected by Feng and Xiong raises a key question in relation to the present study: is it possible to outline a reliable description of the long-term development of the Chinese ceramic industry from historical records?

In order to address this question, an exploratory analysis was undertaken which consisted of re-reading Feng and Xiong's collections of documents and re-grouping them by date (publication or record) and theme. This also allows a tentative outline of the development of Chinese ceramics and ceramic industries to be proposed, whilst acknowledging that it is far from complete or perfect.

Before such a discussion is presented, a brief introduction to the development of Chinese historical records on ceramics will be presented which will review the essential and significant historical descriptions, monographs and records on Chinese ceramics. It is necessary to repeat the use of some historical records, especially within the section on the grading of Chinese ceramics, where the historical records are highly important for allowing the grouping of Chinese ceramics according to value.

2.3.1 Background of Chinese ceramic historical records

The earliest historical documents of ancient Chinese ceramics are very rare and come from classic books, such as the *Books of Rites (礼记), Han Feizi (韩非子),*

Chronicle of Zuo (左传), and so forth (Wang 2004c:10-11, Xiong 2006b:1-3). These classic works were published (or have a recorded date) earlier than the 2nd century AD, and provide a general description of the early stages of Chinese history, social forms, administrations and ceremonial rites. However, these records rarely record Chinese pottery, although they do mention the different forms, ceremonial use, functional use and related stories, rather than direct descriptions of the ceramic industry and pottery fabrics, shapes and decorations. Books, such as *The Book of Diverse Crafts* (考工记), *The Annals of Lu Buwei* (吕氏春秋), and so forth, record that in the age before the 2nd century BC, officials supervised the production of potteries for Chinese central courts, and the regulations of pottery manufacturing have been recorded in detail (Wang 2004c:10-11, Xiong 2006b:1-3).

It can be confirmed by archaeological evidence that during the period from approximately the 5th century BC to the 2nd century AD, the Chinese ceramic industry, including both pottery and stoneware, had been well established and had developed (Feng 2009, Shen 2009, Zheng 2009), and the rare historical records are well supported by the archaeological evidence.

The Chinese ceramic industry entered a prosperous age in the 7th century AD, and *The Classics of Tea (茶经)*, was the first monograph about tea written by a Tang tea master Lu Yu (733-804). This book ranks Chinese stoneware, and is the first occurrence within ceramic history that stoneware and pottery had been studied and ranked. According to Lu Yu, Yue celadon (produced in Zhejiang Province, southern China), was regarded as the best tea drinking ware at that time, whilst Xing white stoneware/porcelain (produced in Hebei Province, northern China) was also highly praised, as noted by the description ‘a kind of most popular ceramics with a fair price’ in the book *A Supplementary History of Tang (唐国史补)*.

Since the Tang dynasty, an increasing number of classical books, monographs and other records started to include details on Chinese ceramics. Based on Feng’s work, up until the 19th century, approximately 550 books had been written on Chinese ceramics. These books consist of historical classics, provincial and council choreographies (府志、县志), poetry collections (诗歌集), and short story collections (笔记小说) (Feng 2000:8).

2.3.2 Discussion on the historical records of Chinese ceramics

(1) The numerical bias of historical records

Historically, based on the works of Feng and Xiong, about 230 kilns have been recorded as dating from the Tang to Qing dynasties (618-1912 AD) (Feng 2000). These were geographically located within 18 of the modern Chinese provinces; Henan, Zhejiang, Fujian and Shanxi had over 20 kilns each, whilst Hebei, Gansu and Guangdong had 10 kilns each.

A count of these historical records reveals that about 86% were recorded or published after the 14th century (Table 2.1). The number of accounts decreased during the Yuan period and then sharply increased during the Ming and Qing dynasties. It should be noted that the large number of accounts recorded in the Ming and Qing periods are due to well-recorded provincial and council choreographies (Liang and Weng 2008:93-94, Chen 2009).

Table 2.1: Number of historical accounts of ceramic kilns dating from the Tang to Qing dynasties.
Source: (Feng 2000: 33-143, Xiong and Xiong 2006: 13-37, 147-149).

Chinese Dynasty	Tang	Song	Yuan	Ming	Qing	Total
Numbers of historical accounts of kilns	18	81	30	302	497	928

Table 2.2: Comparison of the number of kilns according to historical accounts and known archaeological kiln sites from the Tang to Qing dynasties.
Sources: (historical accounts Feng 2000:33-143, archaeological kiln sites are based on Dataset 1 in Appendix 1)

Chinese Dynasty	Tang	Song	Yuan	Ming	Qing
Number of kilns according to the historical accounts	11	23	22	117	181
Number of archaeological kiln sites	53	109	55	30	Approx.30

However, based on the archaeological datasets in Appendices 1 and 2, the archaeological evidence presents a different picture, as more archaeological kiln sites have been found during the early period and only a smaller number have been found after the Ming dynasty (Table 2.2). This contradiction will be explained in detail in the following sections of this chapter.

According to archaeological excavations and surveys since the early 20th century, ceramic kiln sites have been individually discovered and the archaeological understanding of ceramic kilns does not match well with the historical understanding. From the 240 historically recorded kilns (Feng 2000) and approximately 140 archaeological based kiln sites (Dataset 1 in Appendix 1), no more than 60 kiln sites can be matched.

Hence, it must be that a numerical bias based on the historical understanding has resulted from the relatively small number of historical records dating from the early period (such as the Tang and Song periods). It seems that historical understanding and descriptions from this early period have led to a significant under-estimation of the Chinese ceramic industry at this time. Early historical records on Chinese ceramics were limited but increased during the Tang to Song period, but then decreased again, probably due to the negative attitude towards ceramics held by the Yuan Mongolian rulers (Medley 1974:1, Anonymous 1998:Vol. 22).[3] Later, in the 15th century, Ming China began to focus on recording details of the ceramic industry and there is a sharp increase in the number of historical accounts. Another reason for this bias is that there are always more recent texts than old ones, as texts get destroyed and lost as time passes.

(2) Themes of historical records

According to a re-reading of the collected historical accounts, most do not contain clear descriptions of the ceramic industry. Feng and Xiong roughly grouped the

[3] This is a famous historical account in which the Yuan rulers call ceramics 'useless items' (YDZ 1998: Vol 22). It also has been suggested that the Mongols had no real interest in the art of ceramics and did not find Chinese taste congenial. This saying remains much debated (Medley 1974: 1), but a discussion here is inappropriate.

records of what they collected (Feng 2000, Xiong 2006b). Although no clear definitions of their categories have been given by their works, these records can be initially defined according to their contents and themes:

a. Geography and Commodities: These accounts describe ceramic kiln locations and simply confirm ceramic production. The descriptions are normally in the form of *'the kiln named …was located at… and ceramic productions have been manufactured from this kiln.'*

b. Identification: Accounts provide details on different wares. The descriptions are in the form of *'the ceramic ware has a …glaze and a …body, it can be distinguished from other wares because of …'*

c. Ranking and Comments: Comparisons of one type of ceramics ware to another, with descriptions in form of *'… wares are better than…wares because of…'*

d. History and/or Stories: Descriptions involve the history of a ceramic kiln, ware or potters, and/or provide a story that involves ceramic ware, kilns or potters.

e. Poetry: Poems compliment, comment or describe ceramic wares and/or kilns.

f. Industrial Description: The descriptions record the scale and/or the number of potters at a kiln, in the form of *'the kiln of … has … individual kilns and …potters.'*

g. Functions or Categories: The descriptions record the functions of ceramic wares or what ceramics have been produced.

h. Manufacturing or Repairing Techniques: The descriptions record the manufacturing or repairing techniques for specific ceramic wares.

i. Other records: Inscriptions on steles or official documents which record local history that involved a kiln.

j. Unreliable Records: These records describe a place name and also a kiln name, which cannot be clearly recognised as a kiln that existed.

Table 2.3: Number of historical accounts from the Tang to Qing dynasties grouped by theme.

Themes	No. of Records
a. Geography and Commodities	560
b. Identification	105
c. Ranking and Comments	81
d. History and/or Stories	75
e. Poetry	28
f. Industrial Description	19
g. Functions or Categories	12
f. Manufacturing or Repairing Techniques	13
i. Other Records	11
j. Unreliable Records	48

Based on this re-grouping of historical records by theme, an exploratory analysis reveals that simple descriptions of ceramic kiln locations and confirmed ceramic production from these kilns (theme a) accounts for a very large proportion (nearly 60%) of the total number of records. About 11% of the accounts provide details on the identification and description of ceramic wares (theme b), about 9% (theme c) provide comments and rank the ceramic wares and kilns, and only 2% of the historical records have directly describe the scale of a kiln, its size and the number of potters (theme f) (Table 2.3).

On this basis, it is suggested that the historical records have provided a non-systematic and biased description of ceramic kilns. Although more than half the records which contain geographical and commercial descriptions are from provincial and council choreographies, they do not provide a detailed description of the scale of the ceramic industry, kiln size and the number of potters, whilst no sound records on trading information have been identified.

2.3.3 Short summary: question of the Chinese historical records on the ceramic industry

Based on the exploratory analysis above of the Chinese historical records on ceramics and ceramic kilns, numerical and thematic biases can be observed in these records. It therefore suggested that historical descriptions do not provide a good understanding of the Chinese ceramic industry, at least from a numerical perspective.

Some important historical descriptions can directly provide evidence for ranking, descripting, grouping and classifying Chinese ceramics; however, care needs to be taken when using these records to gain a general understanding of Chinese ceramic industrial patterns, and archaeological evidence is therefore very important.

2.4 Methodology of this chapter: aim, data collection and exploration.

The full number of Chinese ceramic kiln sites is huge, and, according to contemporary studies, it is impossible to calculate a precise number based on the reports that are available. The only suggested number is mentioned in Xiong

Haitang's work (Xiong 1995:150-151) and he says over 2,770 Chinese ceramic kiln sites were reported up to the early 1990s. They include over 6,100 kiln structures with dates ranging from pre-history to the late 19th century. But it is a pity that Xiong does not provide a full list of these kiln sites and not mention how he collected these data and numbers. It is certain that the number of known kiln sites and their remains will have grown significantly in the past two decades. Another example is that it has been reported by the Guangdong Provincial Archaeological Institute, from 1956 to 1985, that there are 1,382 kiln remains that date from pre-history to the 19th century within Guangdong Province, but only 57 kilns have been surveyed and excavated (Zeng 1991:105), with a similar situation occurring in many provinces of China.

When facing such a huge number of kiln sites, it seems difficult for an individual scholar or a single study to review Chinese ceramic industrial archaeology. However, as mentioned above, a preliminary quantified study is needed to begin to investigate the changing trends in the Chinese ceramic industry. This section therefore aims to collect and analyse data on Chinese ceramic kiln sites focussing on the period from the 8th to 15th centuries.

In order to approach this quantified study, two datasets (see Appendices 1 and 2) have been built based on a collection of 200 key kiln sites. Many of these have been mentioned by past studies (e.g. ZGGSYXH 1982, Medley 1989, He 1996, Quan and Meng 2008, Feng 2009, Pierson 2009, Li et al. 2010b, Fang 2013). Although the kiln site number in this collection is much smaller in comparison with the number suggested by Xiong (1995:150-151), it is the largest data collection, at the moment, of Chinese ceramic kiln sites which includes a kiln site list and parallel evidence.

This section aims to introduce the two datasets of Chinese ceramic kiln sites, the methodology, and an exploratory analysis of the datasets. It consists of three parts; the first is an introduction to the building and collecting of these two datasets; the second sets out the aims of the exploratory analysis; the third discusses the limitations of these datasets.

2.4.1 Building and collecting of Datasets 1 and 2

In both historical and contemporary reviews of Chinese ceramics, it can be noted that many published works contain common faults, in that that they are mainly focusing on 'important and well known' kiln sites (Medley 1989, Vainker 1991, He 1996, Feng 2009, Li et al. 2010b). The locations, characteristics, descriptions and history of each kiln site have been well described in these works, but they have not attempted a long-term and comprehensive dataset-based study. Smaller scale and non-famous kilns producing lower quality ceramics are in many cases missing altogether.

In order to re-consider the Chinese ceramic industry from an archaeological approach, datasets on Chinese ceramic kilns have been collected by the author. These datasets are the largest and most comprehensive collection of data pertaining to Chinese ceramic kiln sites, and include over 200 key archaeological sites of ceramic kilns, which have been re-grouped into 140 sites, due to their fabric and glaze features (Table 2.4 and Appendices 1, 2). These sites are published by archaeological surveys and missions, rather than being based on historically recorded kiln sites (e.g. the Ge kilns have been recorded by historical documents but no direct archaeological excavation could confirm them. Their locations and archaeological finds are in debate. In this case, the Ge kiln site is excluded from this dataset). This dataset still does not provide the full pattern for all Chinese ceramic kiln sites because the total number of archaeological Chinese ceramic kiln sites is difficult to determine, for the reasons that are outlined below:

(1) Studies which systematically record Chinese archaeological excavations of ceramic kilns in order to classify and date ceramic finds and kiln structures are rare. Therefore the archaeological kiln sites collected for this study are mainly taken from published monographs of Chinese ceramic historical and archaeological studies. There have been some important Chinese ceramic studies closely linked to archaeological finds; for example, Feng Xianming reported 54 important Chinese kilns in his book, *Chinese Ceramics (中国陶瓷)* (Feng 2009). These new kilns date

from the Tang to Qing dynasties and include ‘overlapped kilns’, a term that refers to one kiln which could be dated to different Chinese dynasties. For example, the Ding kilns were presented separately in the chapters on Tang kilns and Song kilns, and hence have been counted twice. Quan Kuishan and Meng Yuanshao listed nearly 200 kiln sites, again including overlapped kilns and provided details of 31 new kiln sites and their production in *Ancient Ceramics (古代陶瓷)* (Quan and Meng 2008). However, it should be noted that these works do not fully list all the Chinese ceramic kiln sites and an all-inclusive database of Chinese ceramic kilns remains unavailable.

(2) Although the terminology for this thesis has been defined in section 1.6.1 of Chapter 1, there is no standardised system or terminology for presenting a Chinese ceramic kiln and the meanings of terms such as ‘kiln structure’, ‘kiln complex’ and ‘kiln site’ are not clearly distinguished and are often used interchangeably.

For example ‘Longquan kilns’ is used as a general term and as the name for a kiln complex. There is also a large number of kiln sites with their own names which can be grouped under the Longquan kiln sites. The published reports of the Longquan kiln sites are included, for example, the Anrenkou (安仁口) (SHBWGKGB 1986), Shang Yan’ercun (上严儿村) (Li et al. 1986), Jincun (金村) (Zhang 1989a), Dayao (大窑) (Zhu 1989a), Longquan Dongqu (龙泉东区) (ZJSWWKGYJS 2005) and Dayao Fengdongyan (大窑枫洞岩) (ZJSWWKGYJS et al. 2009) kiln sites. It has been suggested that the overall number of known individual kiln structures at the Longquan kilns is somewhere between 350 and 455 (Yang 2011:17, Qin and Liu 2012:10). Therefore, a full collection of all the kiln structures is difficult to draw up, and therefore as details for all known excavations of the Longquan kiln sites, they have been grouped together as one and named ‘the Longquan kiln sites’ in this dataset.

Because there is no standardised system to present Chinese ceramic industries, this data collection uses ceramic features and fabrics to re-group the collected kiln remains/sites. Hence, among these 200 collected kiln remains/sites, 78 kiln sites can be attempted to further combine to 18 kiln sites. And therefore, these two datasets are in the form of a list of 140 kiln sites. These are listed below: (see Appendix 1 for their references):

- Yue Kilns:

Yinxian kilns (鄞县窑), Shangyu kilns (上虞窑), Huangyan kilns (黄岩窑), Ningbo kilns (宁波窑), Fenghua kilns (奉化窑)

- Ou Kilns：

Wenzhou kilns (温州窑), Taishun kilns (泰顺窑), Yongjia kilns (永嘉窑), Rui’an kilns (瑞安窑), Leqing kilns (乐清窑)

- Wuzhou Kilns：

Jinhua kilns (金华窑), Wuyi kilns (武义窑), Tiedian Kilns (铁店窑), Dukou kilns (渎口窑 Jiangxi Province)

- Longquan Kilns：

Longquan kilns (龙泉窑), Yunhe kilns (云和窑), Jingqiao kilns (迳桥窑 Jiangxi Province), Anrenkou kilns (安仁口窑), Yan’ercun kilns (严儿村窑), Jincun kilns (金村窑), Dayao kilns (大窑), Fengdongyan kilns (枫洞岩窑址)

- Longyou Kilns：

Longyou kilns (龙游窑), Quxian kilns (衢县窑)

- Leizhou Kilns：

Kanghai kilns (海康窑), Suixi kilns (遂溪窑)

- Hengshan kilns:

Hengshan kilns (衡山窑), Hengnan kilns (衡南窑), Leiyang kilns (耒阳窑), Chashan kilns (茶山窑), Miluo kilns (汨罗窑), Yueyang kilns (岳阳窑),

- Xiangyin kilns：

Xiangyin kilns (湘阴窑), Tonggu kilns (铜鼓窑 Jiangxi Province)

- Jingdezhen kilns：

Shihuwan kilns (石虎湾窑), Shengmeiting kilns (胜梅亭窑), Yingtian kilns (盈田窑), Hutian kilns (湖田窑), Liyang kilns (丽阳窑), Luomaqiao kilns (落马桥窑窑址), Imperial Kilns (御窑), Nanyao kilns (南窑窑址), Leping kilns (乐平窑), Lantian Kilns (兰田窑)

- Jizhou Kilns：

Jizhou kilns (吉州窑), Yonghezhen kilns (永和镇窑)

- Ganzhou Kilns：

Qilizhen kilns (七里镇窑), Longnan kilns (龙南窑), Huichang kilns (会昌窑), Xunwu kilns (寻乌窑), Dayu kilns (大余窑), Yudu kilns (于都窑)

- Hongzhou Kilns：

Fengcheng kilns (丰城窑), Hongzhou kilns (洪州窑), Linchuan kilns (临川窑), Shangyou kilns (上犹窑)

- Jianyang Kilns：

Jiangkou kilns (将口窑), Niupilun kilns (牛皮仑窑), Jian’ou Kilns (建瓯窑), Lupingshan kilns (炉坪山), Jishui kilns (吉水窑), Yulinting Kilns （遇林亭窑）

- Zhangzhou Kilns：

Pinghe kilns (平和窑), Zhangpu kilns (漳浦窑), Nanjing kilns (南靖窑), Yunxiao kilns (云霄窑), Zhao’an kilns (诏安窑), Hua’an kilns (华安窑)

- Tong’an Kilns：

Xianyou kilns (仙游窑), Dongshandao kilns (东山岛窑址), Tong’an kilns (同安窑)

- Quanzhou Kilns：

Anxi kilns (安溪窑), Dongmen kilns (东门窑), Quanzhou kilns (泉州窑)

- Dehua Kilns:

Qudougong kilns (屈斗宫窑), Dehua kilns (德化窑), Jiabeishan kilns (甲杯山窑)

- Cizhou kilns:

Guantai kilns (观台窑), Jiabicun kilns (贾璧村窑)

Therefore, all of these collected 200 key kiln remains/sites are regrouped into 140 listed kiln sites in two datasets. Dataset 1 (Appendix 1) provides details on the locations, date and references, whilst Dataset 2 (Appendix 2) provides details on the different classes of wares that were produced.

(3) As Table 2.3 shows, the historical recorded kilns sites could not be well matched to current archaeological sites. It indicates that in the Tang and Song periods there were many archaeological kiln sites with a few historical kilns, but in the Ming period there were few archaeological sites and each with many historical kilns. This point hints that a full and comprehensive pattern is hard to determine based on current historical and archaeological understanding.

Due to these reasons, the data in this study is based mainly on a re-examination of important and well-surveyed and excavated kiln sites that have been previously published. Monographs of kiln excavation reports and proceedings of archaeological and ceramic studies have also been re-examined and included.

This section does not aim to encompass all the Chinese ceramic kiln sites and finds and there are a number of sites that have not been incorporated into the dataset, including sites that are located in present-day Inner Mongolia, Gansu, Ningxia and Northeast China, as both politically and geographically these were not located in the ancient Chinese central area and most were alien nation kilns. Most of their productions were considered as the ‘alien nations’ ceramics (e.g. the Liao ceramics), rather than ‘Chinese ceramics’ that exported outside of Chinese markets.

Table 2.4: List of Chinese Ceramic Kiln Sites within Datasets 1 and 2.

(KN= Kiln Site Number, see their locations according to Map 1.1 and see their references according to Dataset 1 in Appendix 1)

KN	Name	KN	Name	KN	Name	KN	Name
1	Shouzhou 寿州窑	36	Foshan-Shiwan 佛山石湾窑	71	Jiangxia 江夏窑	106	Raoping 饶平窑
2	Cizao 磁灶窑	37	Guanchong 官冲窑	72	Husi 湖泗窑	107	Liuzhou 柳州窑
3	Huai'an 怀安窑	38	Changsha 长沙窑	73	Chenzhou 郴州窑	108	Hengfeng 横峰窑
4	Guilin 桂林窑	39	Ganzhou 赣州窑	74	Hongjiang 洪江窑	109	Jing'an 靖安窑
5	Yueyang 岳阳窑	40	Quyang/Ding 曲阳/定窑	75	Pengxian 彭县窑	110	Yuxi 玉溪窑
6	Yixing 宜兴窑	41	Jingxing 井陉窑	76	Longquan 龙泉窑	111	Lufeng 禄丰窑
7	Zhangshu 樟树窑	42	Huixian 辉县窑	77	Quanzhou 泉州窑	112	Jianshui 建水窑
8	Hongzhou 洪州窑	43	Lushan 鲁山窑	78	Xin'an 新安窑	113	Yuxian 盂县窑
9	Yanshan 铅山窑	44	Mixian 密县窑	79	Yiyang 宜阳窑	114	Huaihua 怀化窑
10	Qionglai 邛崃窑	45	Dengfeng 登封窑	80	Ru 汝窑	115	Huiyang 惠阳窑
11	Qingyanggong 青羊宫窑	46	Hebi 鹤壁集窑	81	Linru 临汝窑	116	Boluo 博罗窑
12	Deqing 德清窑	47	Yuzhou 禹州窑	82	Xunyi 旬邑窑	117	Jieyang 揭阳窑
13	Yue 越窑	48	Neixiang 内乡窑	83	Jiexiu 介休窑	118	Hepu 合浦窑
14	Wuzhou 婺州窑	49	Jiaxian 郏县窑	84	Mengjiajing 孟家井窑	119	Dangyangyu 当阳峪窑
15	Ou 瓯窑	50	Yaozhou 耀州窑	85	Tushan 涂山窑	120	Pacun 扒村窑
16	Cizhou 磁州窑	51	Hunyuan 浑源窑	86	Zhangzhou 漳州窑	121	Qixian 淇县窑
17	Xing 邢窑	52	Pingding 平定窑	87	Qujiang 曲江窑	122	Nanping 南平窑
18	Gongyi 巩义窑	53	Fanchang 繁昌窑	88	Hui'an 惠安窑	123	Pucheng 浦城窑
19	Xingyang 荥阳窑	54	Renli 仁里窑	89	Nan'an 南安窑	124	Luoyang 洛阳窑
20	Anyang 安阳窑	55	Yaotouling 摇头岭窑	90	Putian 莆田窑	125	Minqing 闽清窑
21	Qufu 曲阜窑	56	Xiajian 霞间窑	91	Fuqing 福清窑	126	Lianjiang 连江窑

KN	Name
22	Zhongchenhao 中陈郝窑
23	Zibo 淄博窑
24	Yanqian 岩前窑
25	Songkou 竦口窑
26	Kongling 孔灵窑
27	Qinxi 琴溪窑
28	Jianyang 建阳窑
29	E’zhou 鄂州窑
30	Guangze 光泽窑
31	Jiangle 将乐窑
32	Chaozhou/潮州窑
33	Xicun 西村窑
34	Gaoming 高明窑
35	Meixian 梅县窑

KN	Name
57	Hengyang 衡阳窑
58	Linjiang 临江窑
59	Jizhou 吉州窑
60	Jingdezhen 景德镇窑
61	Xiafuqiao 下符桥窑
62	Tong’an 同安窑
63	Fengkai 封开窑
64	Shaxian 沙县窑
65	Xiamen 厦门窑
66	Sanming 三明窑
67	Songxi 松溪窑
68	Huizhou 惠州窑
69	Guiping 桂平窑
70	Rongxian 容县窑

KN	Name
92	Yongchun 永春窑
93	Zhangping 漳平窑
94	Minhou 闽侯窑
95	Tengxian 藤县窑
96	Xing’an 兴安窑
97	Yiyang 益阳窑
98	Nanfeng 南丰窑
99	Nankeng 南坑窑
100	Dazhou 达州窑
101	Guan Kilns 官窑
102	Longhua 隆化窑
103	Huozhou 霍州窑
104	Changzhi 长治窑
105	Dehua-QB 德化窑

KN	Name
127	Shaowu 邵武窑
128	Ningde 宁德窑
129	Lei'zhou 雷州窑
130	Nanhai 南海窑
131	Longjingkeng 龙颈坑窑
132	Heyuan 河源窑
133	Hengshan 衡山窑
134	Longyou 龙游窑
135	Xiangshan 象山窑
136	Quan’nan 全南窑
137	Lingling 零陵窑
138	Nancheng 南城窑
139	Guangyuan 广元窑
140	Beihai 北海窑

In summary, details of 140 important kiln sites have been collected and are listed in Appendix 1. The glaze type used at these important kiln sites will be re-examined, whilst the decorations, shapes and ceramic fabrics and marks will not be discussed for this dataset.

2.4.2 Exploratory analyses of Datasets 1 and 2 (Tables 6.1 to 6.6).

Tables 6.1 to 6.6 in Appendix 4 show a summary analysis of the kiln site numbers, ceramic classes and their percentages according to the six periods described above. This section then sets out some preliminary archaeological observations on distributions and distributional changes of Chinese ceramic kiln sites through time. Using the collected data, six maps (Maps 2.1 to 2.6) of the distribution of Chinese ceramic kiln sites set out the changes in the Chinese ceramic industries from the 6^{th} to 16^{th} centuries. Using the dating evidence reported from each kiln site, each of these six maps shows the locations of ceramic industrial production and industrial shifts and movement can be seen in this way. It is suggested that direct effects of the changes in Chinese political territories and maritime economic interests on Chinese ceramic industrial patterns can be seen. These trends seem to reflect changes in the classes of Chinese trade ceramics that were produced. These analyses will lead on to discussion of the relationship between Chinese ceramics and Chinese trade ceramics further on in this thesis.

2.4.3 Limitations of this analysis

Of course it must be acknowledged that there are several limitations to the data on which this discussion is based. Firstly the analysis is based only on available published archaeological excavations and surveys, and it was often difficult to standardise the classification of ceramic classes based on the published descriptions. This is particularly true of the white ceramics, descriptions of which vary from white stoneware, celadon ware and Qingbai ware. In order to avoid this problem, a definition of the different classes used here has been provided, although inaccurate published details might in some cases have led to errors in the changing trends that are set out here.

Another problem is that the scale of the archaeological kiln surveys and excavations is not always provided in the publications, as was mentioned earlier. The scale of a kiln is a major problem as individual kiln sites which have been the focus of archaeological exploration are not grouped under a standardised classification. For example, the Longquan kilns had a very large ceramic industry covering over 400 individual kiln sites in the 14th century (Qin and Liu 2012:445), yet are represented as one kiln site within the dataset. Ultimately, this will have led to some notable bias in the understanding of some periods of China's ceramic industry. There is nothing that can be done about this until it is possible to compile a more complete dataset. Nonetheless, in the meantime it is argued here that an exploratory analysis of the dataset has the potential at least to identify some important trends in Chinese ceramic production through time, even if the results have to be tempered with a note on the possible limitations of the dataset.

2.5 Exploratory analyses and discussions on the Datasets 1 and 2.

Based on the questions raised above following the review of Chinese ceramic history and the historical records, this section aims to provide a tentative overview of the Chinese ceramic industry from a purely archaeological perspective based on kiln site distribution and ceramic classes. Using the datasets collected by the author, it is possible to propose a preliminary outline of the trends and changes in Chinese ceramics.

2.5.1 Numbers and the distribution of Chinese Ceramic Kiln Sites

From the 2nd to the 16th century the distribution pattern of Chinese ceramic kilns and the ceramic industry changed many times. According to Dataset 1 (Appendix 1) and Tables 6.1 to 6.6 (Appendix 4), it can be seen that the number of kilns altered during the different periods from the 6th to the 16th centuries. Figure 2.6 shows that from the 6th to about the 11th century there was a steady increase in the Chinese ceramic kiln industry, reaching a peak in the 12th to 13th century, at which point in time the Song dynasty lost the northern Chinese territory. When the Mongol rulers incorporated occupied China into the Mongol Empire, the Chinese ceramic industry started to decrease, and this decline continued until the 16th century. However, it should be noted that the numerical decrease may not directly represent a decline in the Chinese ceramic industry, and hidden behind this there may be a monopolisation process that occurred during the 14th to 16th centuries. This point will be further explained in the following paragraphs.

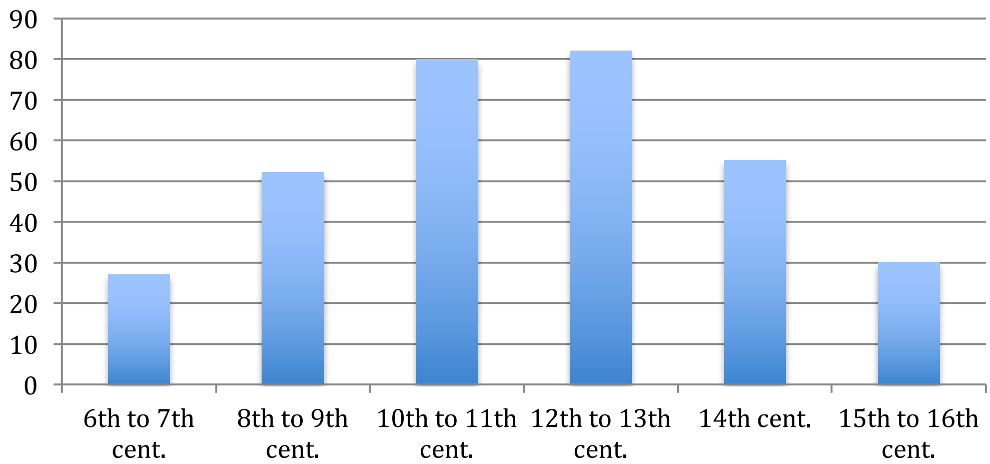


Figure 2.6: Change in the number of Chinese kiln sites from the 6th to the 16th century.
(Based on Datasets 1 and 2 in Appendices 1 and 2 and Tables 6.1 to 6.6 in Appendix 4)

The following sections provide an exploratory analysis of the dataset according to the changes occurring from period to period. However, it should be noted that during the early period, ceramic distribution was definitively linked to the availability of natural resources, such as fine clays, rivers and woods. With the development of the Chinese ceramic industry, the demand for good quality ceramics from palaces in the capital cities and for traded wares from port cities strongly shaped the development of the distribution of the ceramic industry. According to the dataset compiled by the author this section aims to discuss the change in the distribution pattern of the

Chinese ceramic industry from the 6^{th} to the 16^{th} century.

(1) Distribution of Ceramic Kilns during the 6^{th} to 7^{th} centuries

It has been mentioned before that as early as the 2^{nd} century AD, celadon stoneware was successfully produced in Zhejiang Province in southern China (Li 1978a, Feng 2009:251). The Zhejiang area went on to develop a celadon/black glaze ware based ceramic industrial centre during the 3^{rd} to 5^{th} centuries (Zhu 1981, Feng 2009:243, 253, Li 2011b, Luo 2012). The form of this ceramic centre was closely linked to the vast distribution of natural resources within Zhejiang (ZJSKWWKGYJS et al. 2002:1). In Fujian Province, the earliest ceramic kilns have been found in Zhenghe County, which is a neighbouring ceramic industry to that of Zhejiang (Chen 2013).

At this time the northern Chinese ceramic manufacturing industry was mainly focused on producing earthenware, which was rarely used as tableware in the north of China (Quan and Meng 2008:108). Until the 6^{th} century, white stoneware was mainly only fired in northern China, due to fine clay with a lower percentage of iron which was available in Hebei Province, rather than advanced ceramic firing techniques (Li 1998:149-151).

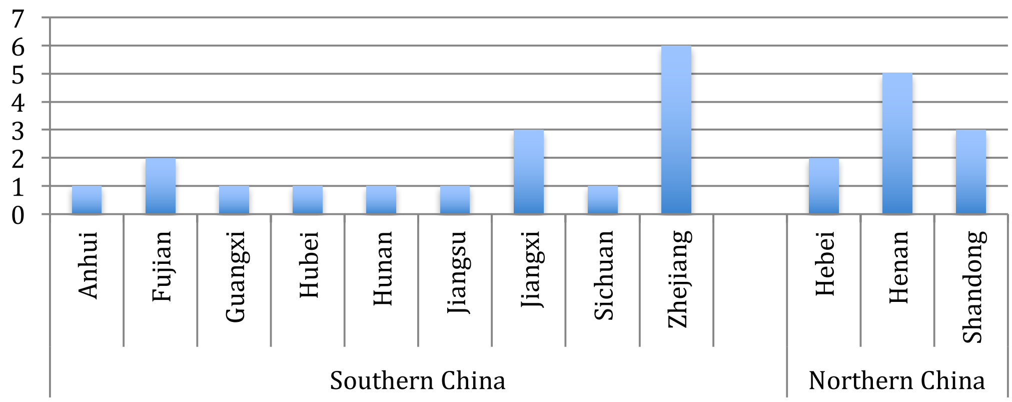
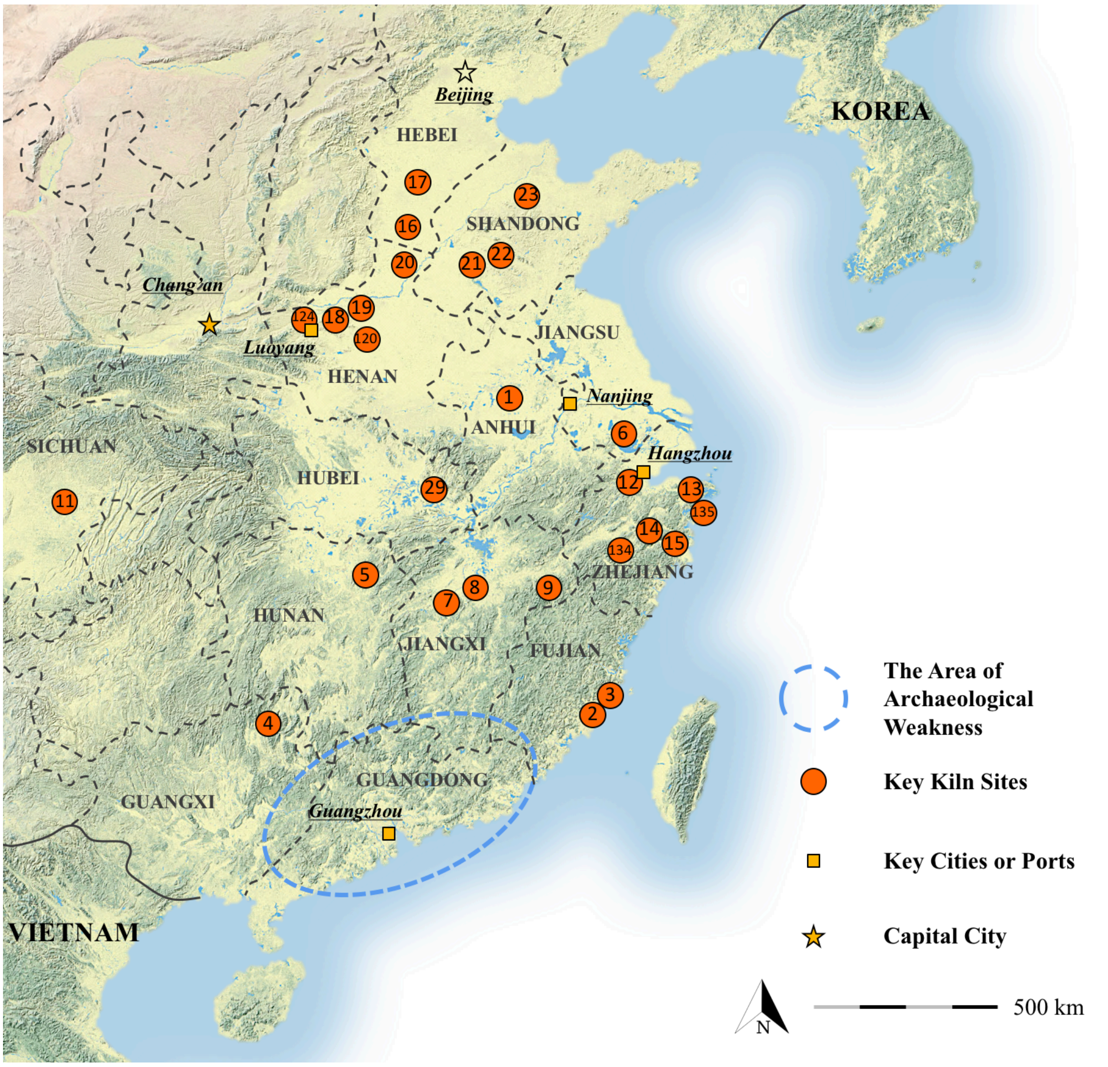


Figure 2.7: Number and distribution of ceramic kiln sites in southern and northern China in the 6th to 7th centuries.

(Based on Table 6.1 in Appendix 4)

According to Table 6.1 in Appendix 4, 27 ceramic kiln sites date to the 6th to 7th centuries and are distributed across 12 provinces of China (Figure 2.7). Southern

China had 17 kiln sites, with more than half positioned in the provinces of Zhejiang and Jiangxi, supporting the idea that these two provinces became a centre of ceramic production in southern China. Away from these two provinces, ceramic kilns have mostly been found in the provinces of Fujian, Guangxi, Sichuan and Anhui, with no kiln sites having been found in Guangdong (light-blue dotted circle shown on Map 2.1). However, according to burial findings, especially celadon jars from local tombs, it seems that Guangdong must have had a well-developed ceramic industry (GZSWWGLWYH 1981, Huang 2004:44).



Map 2.1: Key kiln sites and cities in the 6th to 7th centuries.
(Drawing by Ran Zhang)

It is difficult from Map 2.1 to determine a clear link between the distribution of key kiln sites and key cities/ports. For example, the Sui Chinese capital, Chang'an

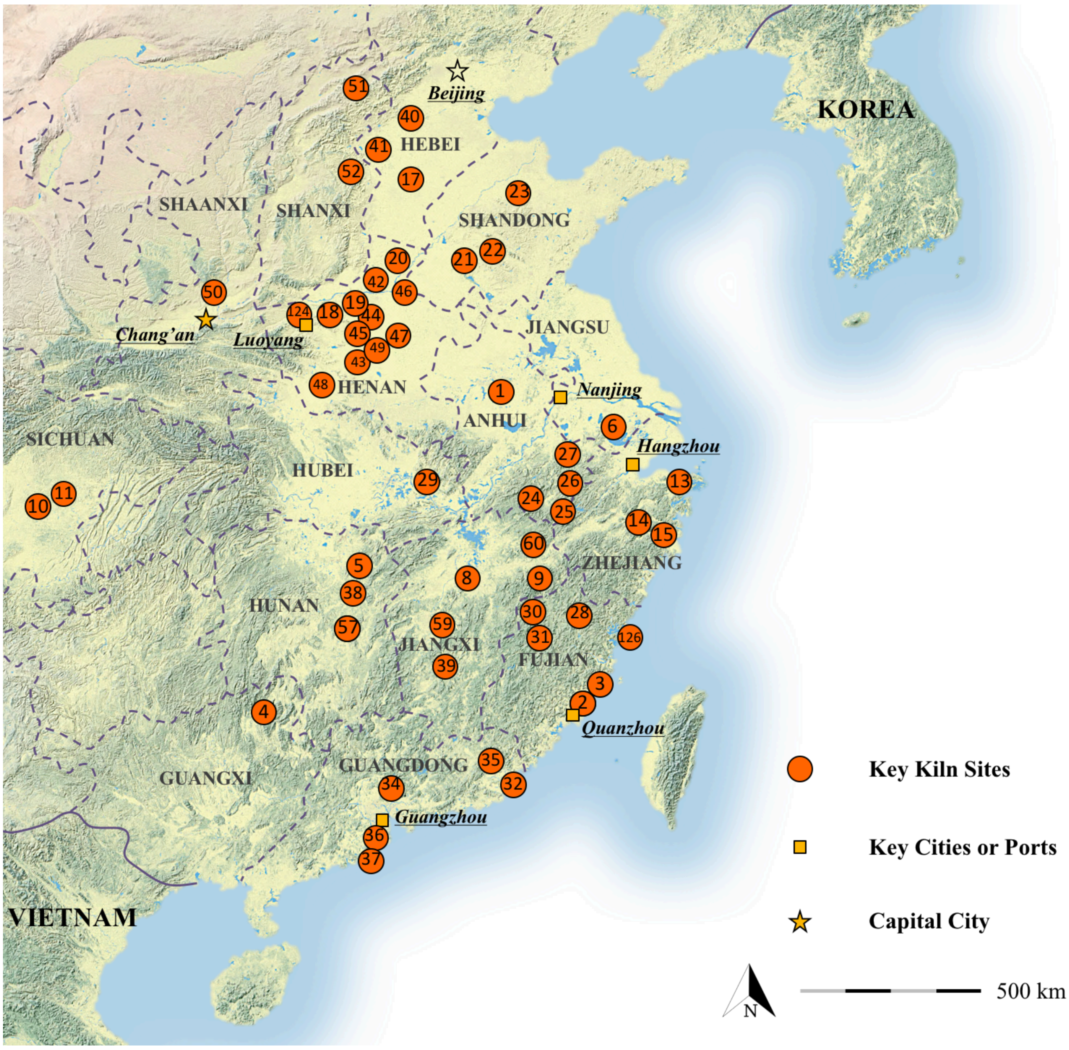
(Daxing city), had no local ceramic industry, with a similar situation occurring near the city of Nanjing and the port of Guangzhou. Archaeological evidence for Guangdong is poor and provides no clear support for the existence of a local ceramic industry. Similarly, no archaeological surveys conducted near Nanjing suggest that there was a well-established ceramic kiln industry. In contrast, there is clear evidence of ceramic centres situated near cities such as Luoyang and Hangzhou. It is therefore reasonable to suggest that the distribution of ceramic kilns in the 6th to 7th centuries was mainly based on natural resources, rather than ceramic demands from big cities or ports, as no strong links between kilns and cities/ports can be seen in the distributions.

(2) Distribution of Ceramic Kilns during the 8th to 10th centuries

The 8th century witnessed the height of Tang China, characterised by a long period of political and peaceful stability, which led to steady development of the ceramic industry (Quan and Meng 2008:135). It can be seen from the datasets collected by the author that the total number of ceramic kilns which can be dated to the 8th to 9th centuries sharply increased, from 27 in the previous period to 53, with 32 located in southern China and 21 in the north (Map 2.2 and Figure 2.8).

From Figure 2.8, it is clear that a sharp increase in the number of ceramic kilns occurred in Henan Province, from 5 to 12. Large increases can also be seen in Anhui Province, where the celadon kilns geographically located in southern Anhui had a strong link to the celadon ceramic industry in Zhejiang Province (Han and Feng 2012). Therefore, this suggests that development of the Zhejiang celadon industry influenced local kiln sites in neighbouring provinces. Moreover, in comparison to the previous period, increases in the number of ceramic kilns were also occurring the provinces of Fujian, Guangdong, Hunan, Jiangxi, Sichuan, Hebei, Shaanxi and Shanxi.

In Zhejiang, although only three kiln sites are represented within Dataset 1 (Appendix 1) and this number is less than in the previous period, there was in fact further development of the ceramics industry. This celadon industry consisted of the Yue, Ou and Wuzhou kilns and due to the similar glaze and fabrics, more than 10 sub-kiln sites have been grouped together with these three kiln sites.



Map 2.2: Key kiln sites and cities in the 8th to 9th centuries.

(Drawing by Ran Zhang)

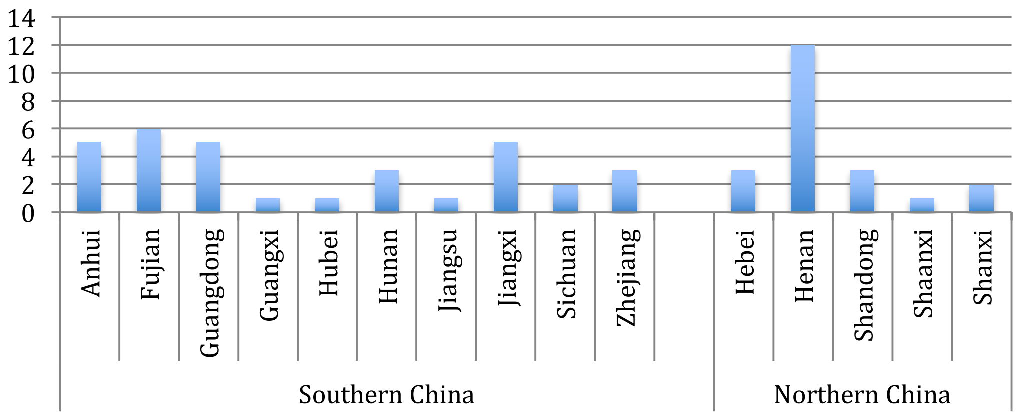


Figure 2.8: Number and distribution of ceramic kiln sites in southern and northern China in the 8th to 9th centuries.

(Based on Table 6.2 in Appendix 4)

With the fast development of the ceramic industry across all of China, both in terms of kiln numbers and firing techniques, it can be seen, based on Figure 2.8, that the distribution of ceramic kilns had started to be linked to big cities and ports. This is mainly due to the higher demand for stoneware, especially fine quality stoneware for the Tang palace (Quan 1999b, Wang 2001, ZJSKWWKGYJS et al. 2002) and the domestic markets (Huang 2006b:82). Ceramic kilns located in the littoral areas, such as the provinces of Zhejiang, Fujian and Guangdong, were influenced by overseas trade (Zhang 2013, Qin 2013) and local ceramic industries developed fast. This suggests that the ceramic industrial pattern in the 8th to 9th centuries was shaped by demand from both Chinese domestic and foreign markets, rather than only by the availability of natural resources.

The 10th century was the time of the Five Dynasties Period (AD 907-960), and the dataset provides a statistical measure that indicates the extent to which the decline in the ceramic industry occurred during this tumultuous age. In many cases, the ceramic kilns and ceramic wares cannot be accurately dated archaeologically to this short dynasty; therefore, the Five Dynasties Period has been considered to be part of the Tang Dynasty in many ceramic art history or ceramic archaeological reviews (e. g. Zeng 2001:152-156, Quan and Meng 2008:135-174). Due to the lack of accurate dating evidence for this period, discussion of the change and development of the ceramic industry during the Five Dynasties Period will provide a biased pattern and consequently will not be included in this section.

(3) Distribution of Ceramic Kilns during the 11th to 12th centuries

Following the steady development of the ceramic industry over the previous centuries, the distribution of kiln sites between the 11th to 12th centuries was closely linked to the important cities of Song China and the port cities along the littoral area in the south.

This steady development of the ceramic industry can be demonstrated by the number of kilns increasing. According to Dataset 1 the total number of kilns increased from 52 to 80 during the Tang period (Map 2.3 and Figure 2.9). Especially in southern China, there was a clear and sharp increase from 32 sites during the Tang period to 56 sites in the Northern Song period, with the provinces of Anhui, Fujian, Guangdong and Jiangxi demonstrating a fast increase.

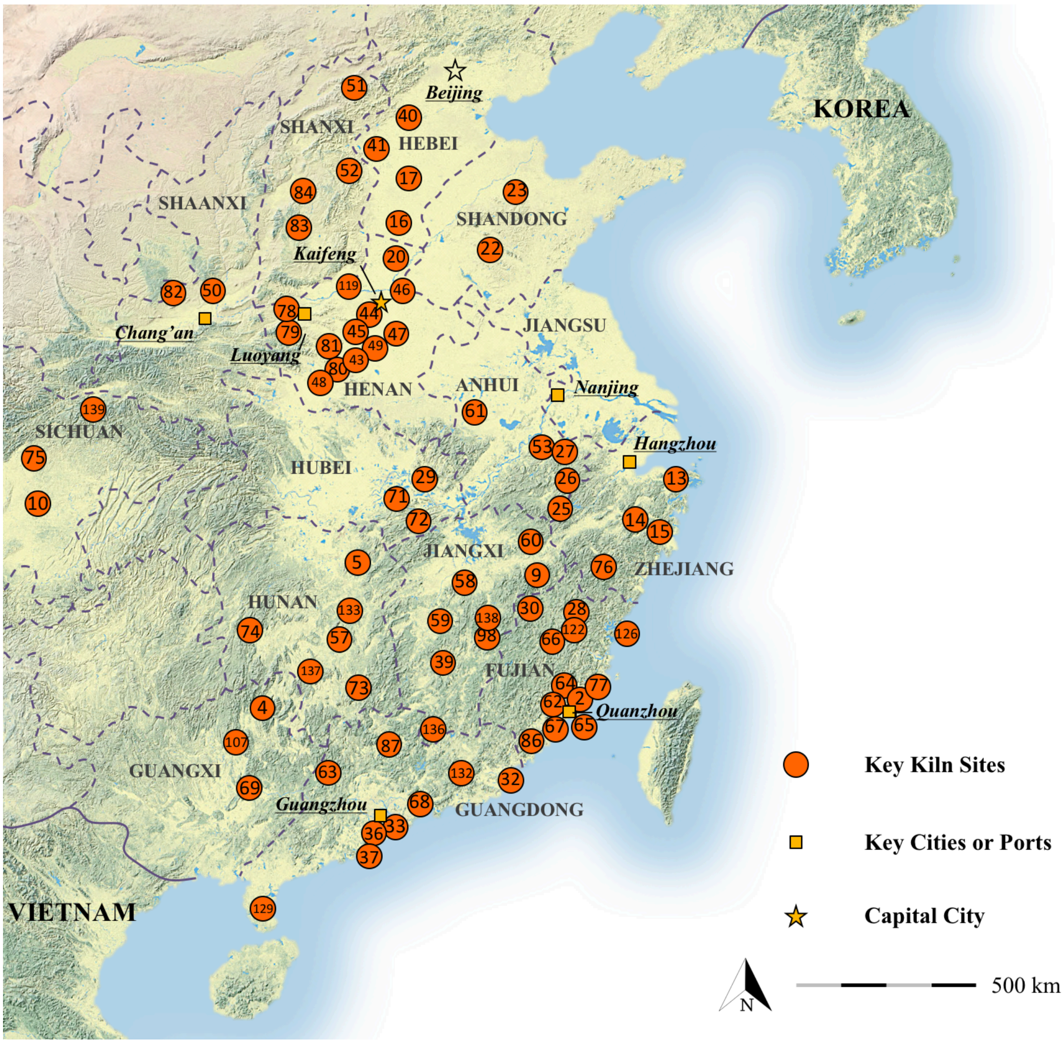
Although the ceramic industrial development in northern China was slow in terms of the number of kilns, the fine quality of celadon produced in the Ru kilns and Yaozhou kilns clearly demonstrates that there was also a steady development in terms of ceramic firing techniques.

It can be seen in northern China, especially in the provinces of Henan and Shaanxi, which includes the cities of Luoyang, the Song capital Kaifeng, and the old-Tang Chinese capital, Chang'an, have two well-established celadon kiln centres positioned at the Ru and Yaozhou kilns. In order to match the demand from the Song imperial palace (Quan and Meng 2008:176), the Ru kilns (Sun 2005) and the so-called 'Guan kilns' (Imperial Kilns)[4] were established near Kaifeng. These two kiln centres enhanced the local celadon manufacturing industry and changed the northern Chinese ceramic industrial pattern which had existed since the 7th century AD, as previously, no fine-quality celadon wares were fired in the north of China.

In southern China kilns were mainly located in the provinces of Jiangxi, Zhejiang, Fujian and Guangdong near the southern Chinese coast. Following the development of the maritime trade, many kilns producing exported wares were established near important port cities, such as Hangzhou and Guangzhou (Qi 1987:682-683). After 1087 AD, the Quanzhou port in Fujian Province began to play a role as an important trade port and the local ceramic industry gradually increased (Ho 2001:246, 258, 261, Li 2010b).

It is reasonable therefore to suggest that the large demand for stoneware for the Song palaces, the big cities and overseas trade influenced the development of the ceramic industry at this time, as the distribution of ceramic kilns fits the pattern of development for the Song major cities and ports.

[4] The Guan Kilns of Northern Song China have not been found in archaeological missions, but it is recorded that they were located in the city of Kaifeng. According to *Fu Xuan Za Lu*(负喧杂录) and Tan *Zhai Bi Heng* 坦斋笔衡: 'During the Xuanhe and Zhenghe reigns (1111-1125 AD), kilns have been built in the Capital and are called the Guan Kilns (Imperial Kilns).'



Map 2.3: Key kiln sites and cities in the 11th to 12th centuries.

(Drawing by Ran Zhang)

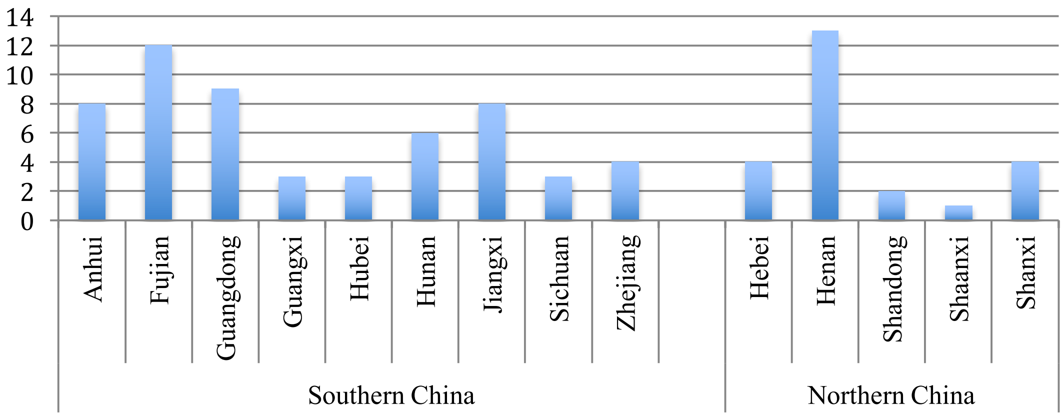


Figure 2.9: Number and distribution of ceramic kiln sites in southern and northern China in the 11th to 12th centuries.

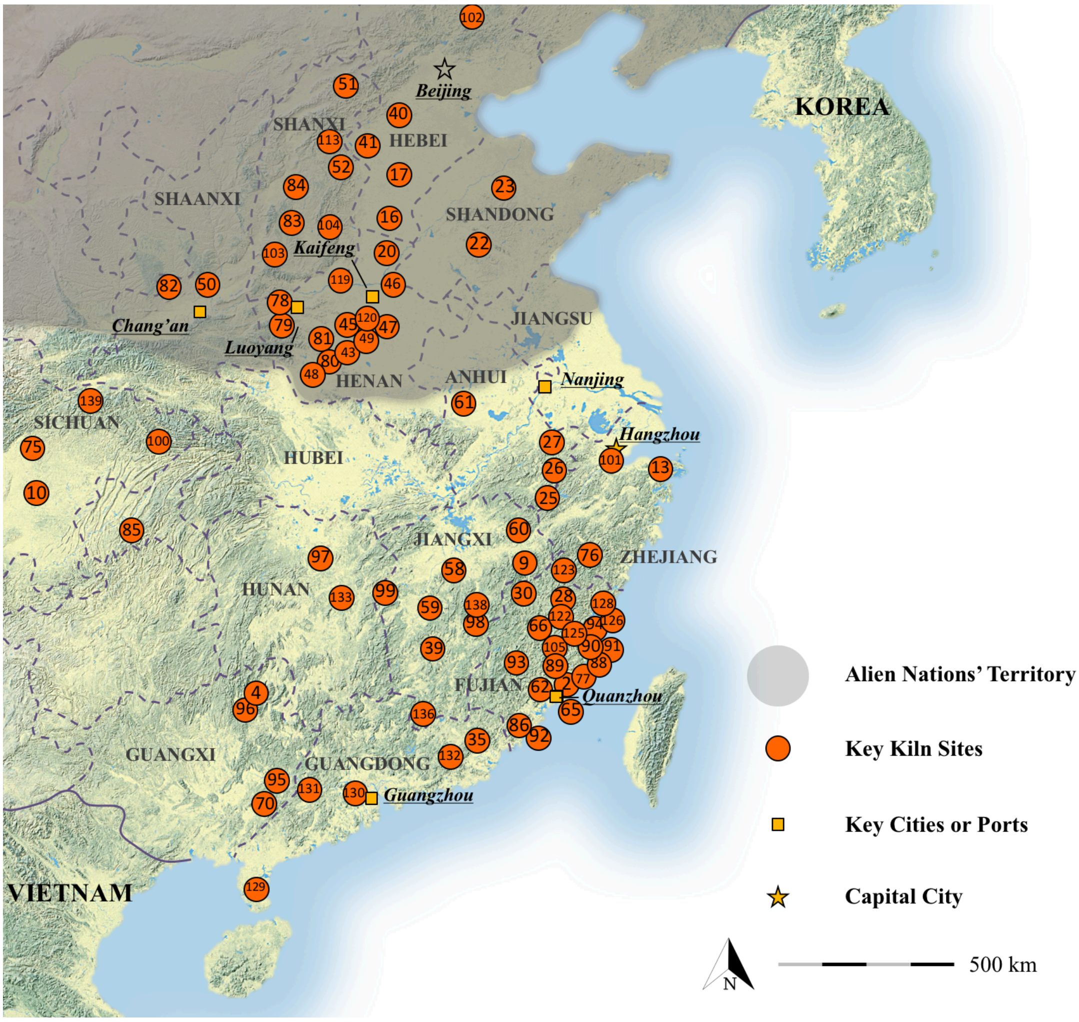
(Based on Table 6.3 in Appendix 4)

(4) Distribution of Ceramic Kilns during the 12th to 13th Centuries

The sharp increase in the number of kilns which occurred during the 6th to 12th centuries had almost stopped by around the 13th century, with only one kiln site demonstrating an increase from 80 to 82. However, this minor numerical change masks the sharp movement of the Chinese ceramic industry during this period from north to south China (Map 2.4)

After losing the northern Chinese territory, the Southern Song Chinese tried to sustain the old ceramic industry of the Northern Song. The Ru kilns that produced the highest quality celadon ware for the Northern Song Chinese central court were occupied by alien nations and ruled by the Liao or Jurchen. In order to fulfil the demand from the high classes of Southern Song China, the ‘Guan kilns’ were established near the new capital of Lin’an (Hangzhou) (Du 2002, HZSWWKGS 2002). Under the rule of alien nations, the north Chinese ceramic industry underwent some further development in Hebei, Shaanxi and Shanxi provinces (Figure 2.10).

In southern China, the fastest development of the ceramic industry occurred in Fujian Province in the 12th to 13th centuries, where the number of kiln sites increased from 12 to 21 (Figure 2.10). At the same time, the Guangdong ceramic industry experienced a decline, with kiln site numbers decreasing from nine during the Northern Song to five in the Southern Song period. It has been confirmed that movement of ceramic centres in the Chinese littoral area was led by a change in the major export city, from Guangdong to Quanzhou (Ho 2001, Yang 2009). Guangzhou played a lesser role during the Southern Song period, and the Guangdong local ceramic industry, such as the Xicun kiln sites and Huizhou kiln sites, soon ceased production (Huang 2005). The rise of Quanzhou in Fujian Province drove the local ceramic industry to its peak (Zeng 2001:156-157).



Map 2.4: Key kiln sites and cities in the 12th to 13th centuries.

(Drawing by Ran Zhang)

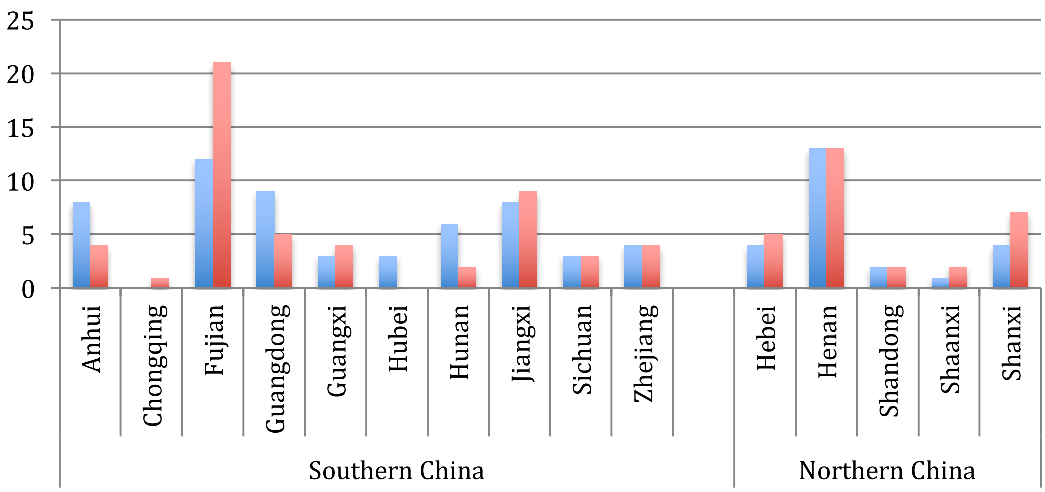


Figure 2.10: Changes of kiln site numbers grouped by provinces of southern and northern China. *(Blue columns=the 11th to 12th centuries and red columns=the 12th to 13th centuries) (Based on Table 6.4 in Appendix 4)*

Many ceramic industry changes occurred in the 12th to 13th centuries; however, these mainly occurred in southern China, rather than northern China which had been occupied by alien nations. Although Song China lost their northern territory, the changes actually imply that kiln distribution was still linked to the high demand for high quality ceramics from big cities or port cities, although these changes were not as fundamental or as big as the changes to the Chinese ceramic industry compared to those experienced in the previous period.

(5) Distribution of Ceramic Kilns during the 14th to 16th Centuries

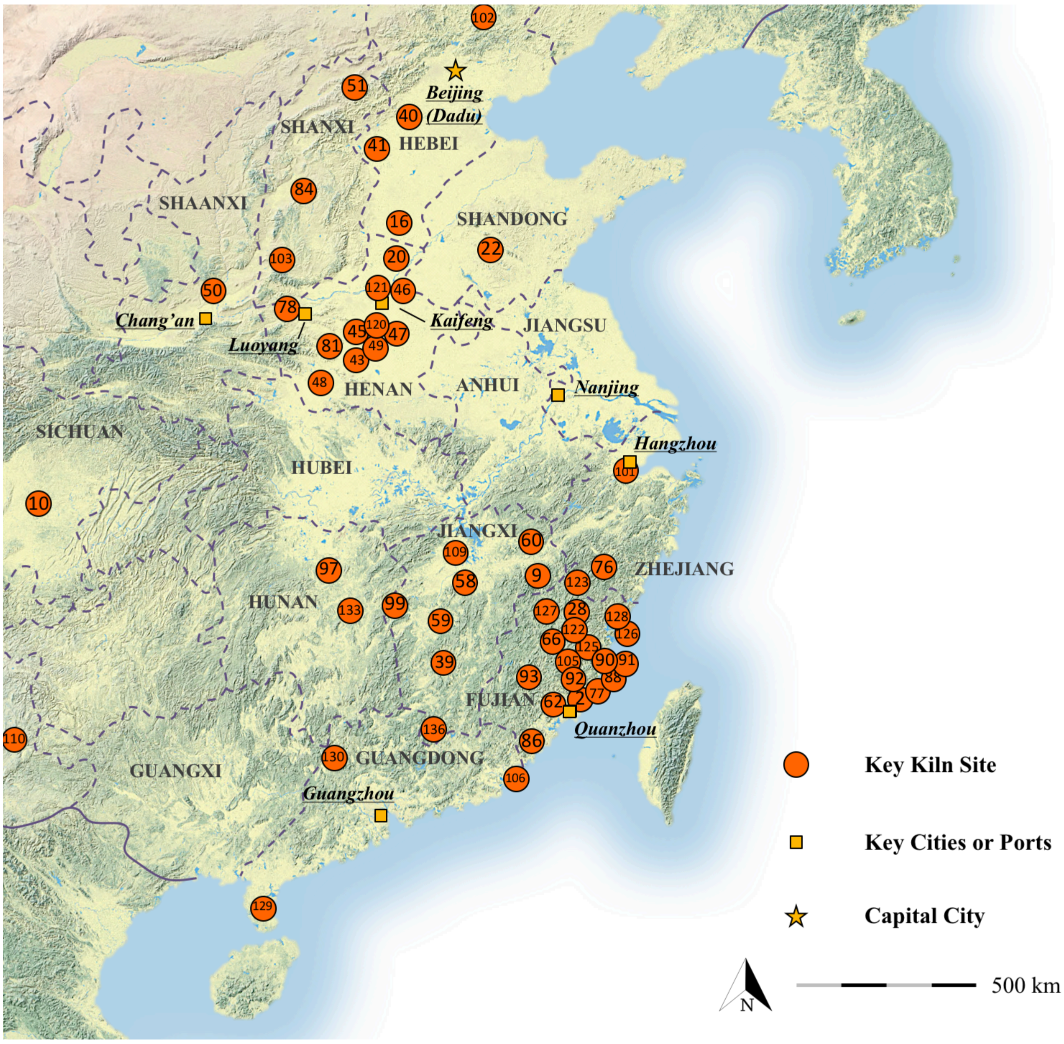
In the 14th century Mongolian rulers re-unified China and made the country part of the Mongol Empire. However, despite reunification it is hard to determine any further development of the ceramic industry at this time and in fact there was a sharp decline in ceramic kiln site numbers during the 14th century. It has been recorded that the Mongolian rulers were less interested in ceramic wares, calling them 'useless items'. One of the main aims of ceramic manufacturing was to export and exchange objects for 'useful items' (Anonymous 1998). It is hard to say whether this is a fair description of the Chinese ceramic industry during the Yuan dynasty (Liu 1981a). However, it should be noted that fundamental changes to the Chinese ceramic industry began during this period.

The statistical observation of ceramic kiln numbers in the 14th century reveals a sharp decrease from 82 kiln sites to 55, with the ceramic industry mainly located in the provinces of Henan, Jiangxi and Fujian (Map 2.5 and Figure 2.11). Although only one kiln site is dated to the 14th century, the Longquan Kilns in Zhejiang Province has been listed in Dataset 1 (Appendix 1), this represents hundreds of individual kilns, and it has even been suggested about 445 kilns (Qin and Liu 2012:10). It can therefore be seen that the Zhejiang and Fujian local ceramic industry produced huge amounts of ceramic ware for export, mainly due to the high demand from port cities such as Hangzhou, Ningbo, Wenzhou and Quanzhou.

In the 15th century, the number of kilns further decreased, particularly in northern China (Map 2.6 and Figure 2.12). In the south, the decline is also evident but many ceramic kilns remained located in the provinces of Jiangxi, Fujian and Guangdong.

Similar to in the 14th century, the Longquan kilns located in Zhejiang still covered a wide area and produced celadon ware. Archaeological excavations have revealed that the Longquan kilns were one of the Imperial ceramic suppliers (ZJSWWKGYJS et al. 2009).

It should be noted that although in terms of kiln site numbers, the ceramic industry had declined since the 14th century, decay had not occurred, rather there was monopolisation by the Jingdezhen and Longquan kilns. This situation occurred following the establishment of Imperial Ceramic Manufacturing during the early Ming period (Wang 2004c:128-143, BJDXKGWBXY et al. 2007). Highest quality ceramic wares have been referred to as among the luxuries that were paid as a tribute to the Ming Chinese central court and emperors.



Map 2.5: Key kiln sites and cities in the 14th century.
(Drawing by Ran Zhang)

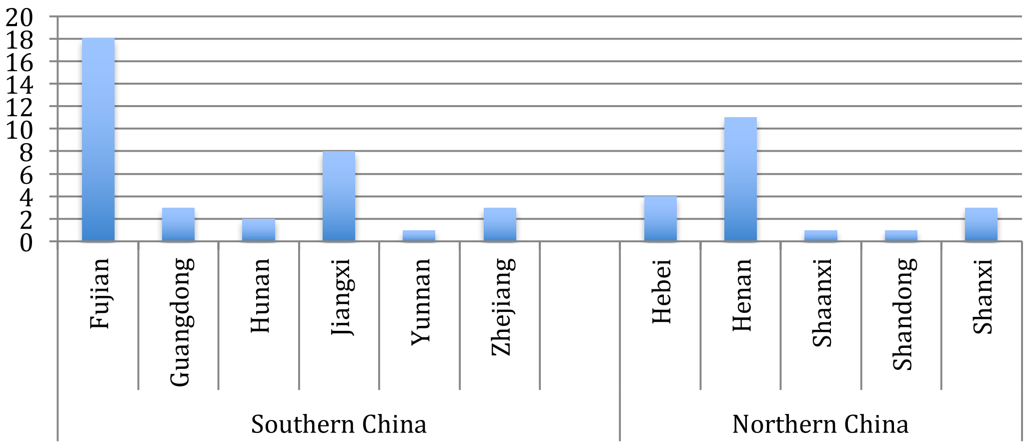


Figure 2.11: Number and distribution of ceramic kiln sites in southern and northern China in the 14th century.
(Based on Table 6.5 in Appendix 4)

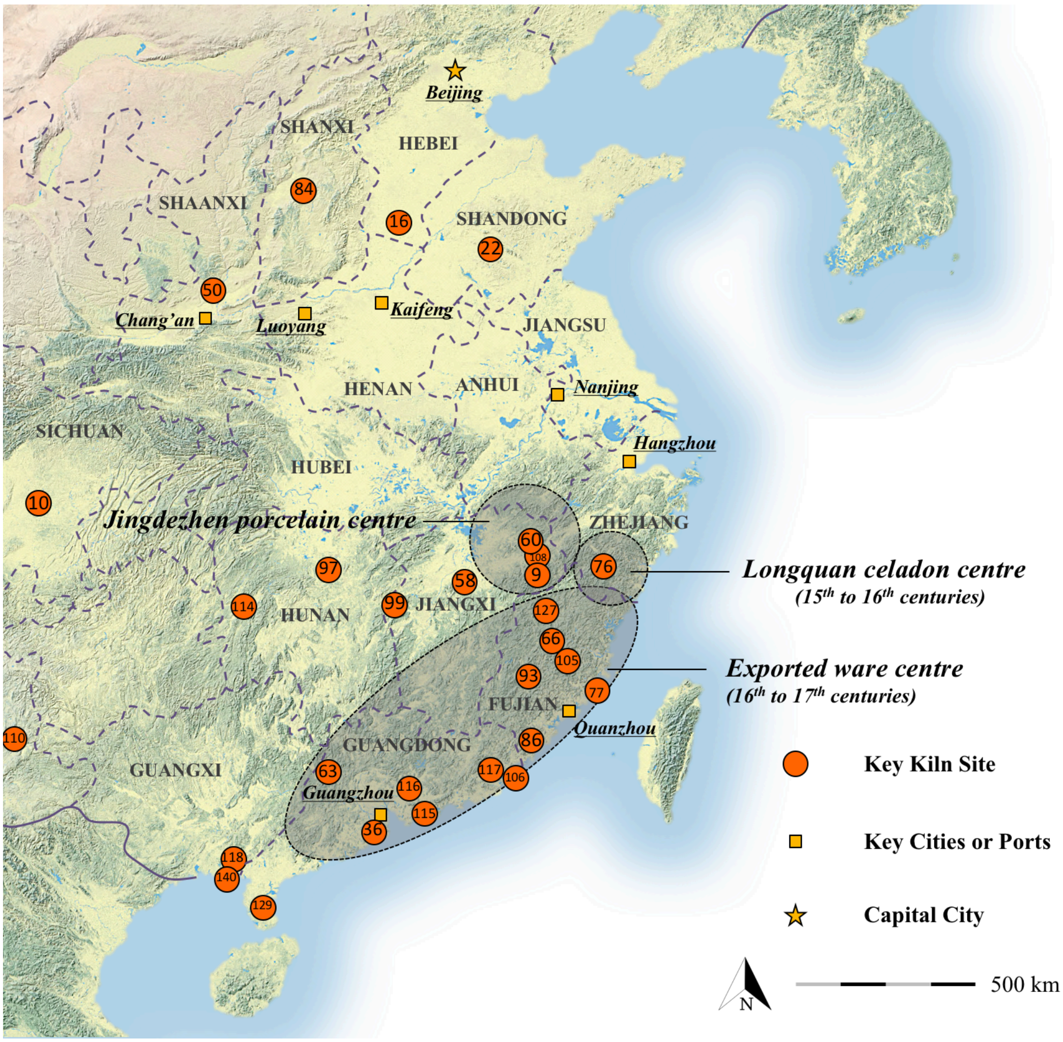
Therefore, such new demands from central government changed the old ceramic payment system and the distribution of ceramic kilns was re-shaped. The links between kilns and capital/big cities was broken and links between natural resources for the finest ceramics and advanced ceramic manufacturing techniques, and the construction of 'Imperial Ceramic Kilns' was established (BJDXKGWBXY et al. 2007). With the founding of these new ceramic centres, such as the Imperial Ceramic Kilns located in the provinces of Jingdezhen and Longquan, neighbouring ceramic kilns also quickly developed, whilst in other areas of China there was a decline in the local ceramic industry.

Ming China lasted for nearly three centuries and the number and distribution of ceramic kilns changed over this long period. However, this study does not go into further details of sub-divided periods of Ming China.

It is well known that during the early Ming period (the 15th and the first half of the 16th centuries), there were two ceramic centres within Jingdezhen and Longquan. Early Ming China banned private foreign trade stipulating that 'no unofficial activity was allowed to trade with foreign countries' (Zhang 1974:vol. 93, Chao 2012),[5] and it

[5] It should be noticed that this ban on private foreign trade was likely to only be nominally adhered to because it has been historically recorded that 'the ban was flexible' and 'private foreign maritime trades

appears that the kilns that produced export wares in southern China did not develop as much during this period due to the decreased demand from foreign traders. The tumultuous years during the late Yuan period (the late 13th century) had also badly influenced the ceramic industry in Fujian Province (Zeng 2001:181).



Map 2.6: Key kiln sites and cities in the 15th to 16th centuries.
(Drawing by Ran Zhang)

occurred with fake official permissions' (Gu 2012 [1639–1662]: vol. 2 of Zhejiang, 49; Anonymous 1962: Xuanzong Shilu vol. 103, 125).

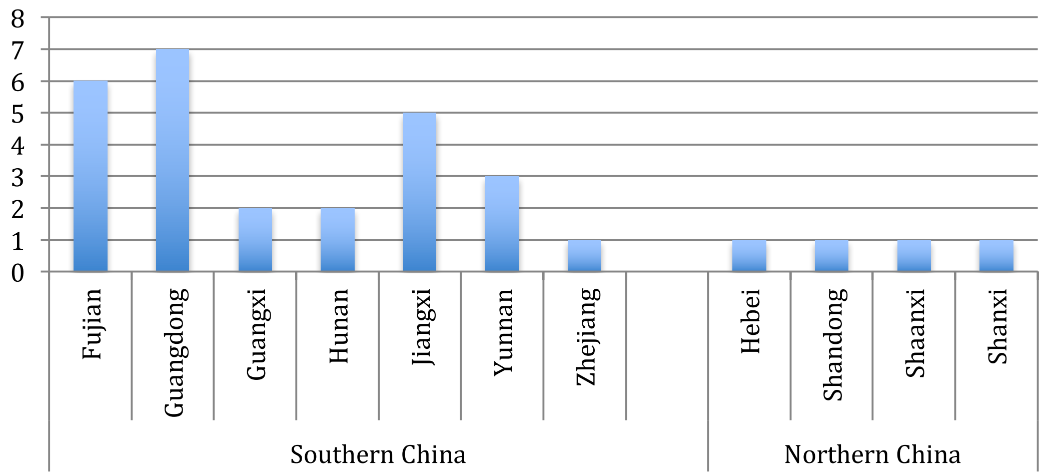


Figure 2.12: Number and distribution of ceramic kiln sites in southern and northern China in the 15th to 16th centuries.

(Based on Table 6.6 in Appendix 4)

In 1567 AD, during the first year of Longqing's reign, Ming China officially re-opened to foreign trade, but trading activities were only allowed in the port of Zhangzhou (Chao 2012:221-223). Around this time the Longquan ceramic industrial centre found it difficult to meet the demand for Imperial Ceramics from the Ming central court due to the poor quality of the ceramics being produced (Qin and Liu 2012:16). Consequently, the Longquan ceramic centre declined and a new ceramic manufacturing centre was established near Zhangzhou port in Fujian (Zeng 2001:181).

In general, from the 14th to 16th/17th centuries, Jingdezhen gradually became the largest ceramic centre in the whole of China, and since the 15th century it was considered to be one of the Imperial Ceramic Kilns. The Longquan celadon ceramic centre in Zhejiang Province quickly developed in the 14th century and also became an Imperial Ceramic Kiln; however, it declined during the 15th/16th centuries, and a centre for export ware arose in Fujian.

2.5.2 Ceramic Classes

It is well known that the Chinese ceramic industry manufactured many different classes of pottery, stoneware and porcelain wares. The current understanding of Chinese ceramic classes is mainly founded on specific monographs that have compiled Chinese ceramic history, art and archaeology (e.g. Medley 1989, He 1996, Quan and Meng 2008, Feng 2009, Li et al. 2010b). Some monographs focus upon individual classes based on historical, archaeological or geographical interpretations (e.g. Zhu 1998, Ye 2005a, Huang 2010). However, very few of these monographs attempt a comparative general survey of the changing trends in Chinese ceramic classes. The only such example can be seen in Huang Yijun's work on the historical and archaeological research of the Qingbai stoneware. She makes an excellent quantitative comparison of the Qingbai stoneware and celadon in the 11th to 14th centuries (Huang 2010). But, still, it seems that there is a lack of full understanding of the changes of Chinese ceramic classes based on a quantitative observation during a long period.

Moreover, it should be remembered that the trade ceramics, as a part of Chinese ceramics, were fundamentally influenced by the development of Chinese ceramic industries, which relate the changes of trade ceramic classification.

Therefore, it is hoped that this section could offer a general trends of Chinese ceramic industries in terms of ceramic classes from the 8th to 15th centuries and then further support that classification creation in Chapter IV. Based on Datasets 1 and 2 (Appendices 1 and 2), it can be seen that the 140 kiln sites in the datasets produced 12 different classes of ceramics (see definitions of these 12 classes below). Based on an exploratory statistical analysis, the changing percentages of different classes will be presented from period to period. This analysis attempts to investigate the changes in Chinese ceramic production that occurred during different periods covered by this study. The changing distribution of manufactures and will also be discussed.

(1) Definition of Ceramic Classes

Within Dataset 2 (Appendix 2) the listed classes are for the major production of these kilns rather than their full production list. In total there are 12 different classes, which are grouped by the reported glaze colours according to publications resulting from archaeological excavations. The definitions of these classes are mainly borrowed from current archaeological terms, including Chinese ceramic studies, but have been simplified and re-grouped for this dataset. These definitions of classes are mainly based on common understanding of Chinese ceramic archaeology. For instance, 'celadon wares' refer to green glazed stoneware or porcelain, and is general name for all green glazed ceramics produced in many different kilns such as the Yue celadon, Longquan celadon or Yaozhou celadon. In this section, all these productions are attributed into the class of 'celadon ware' (abbreviated as 'G'). This attribution is mainly based on the appearance of ceramic wares, such as the colour of glazes, rather than their production locations. For instance, Yue celadon and Longquan celadon will be grouped into 'celadon ware'. The aim of defining these classes is to allow an overview of the pattern of changes to be set out from a long-term perspective from the 6th to the 16th centuries.

The terms used in this study are listed and defined below:

Celadon ware (G): Celadon means green glazed stoneware. In Chinese ceramic archaeology, the definitions of celadon are in the variation from lead green glazed wares to jade-like and thick glazed celadon ware. In order to make this analysis clearer, all reported green glazed wares with different fabric qualities have been defined as Celadon ware.

Yellow ware (Y): Yellow glazed ware refers to items covered by glazes ranging in colour from yellow, brown to red. All items described or reported as yellow, yellowish white, brown, red or dark yellow have been grouped into this class.

Black ware (B): Black ware refer to black glazed wares including thin and badly glazed black glazes, such as Dusun and Martabani wares, and well glazed and so-called 'hare's fur' black glazed wares (Jian black ware).

White stoneware (W): White stoneware consists of all white glazed high fired potteries, stoneware or porcelain. It is very difficult to distinguished badly fired Qingbai (greyish white) ware from white stoneware in many cases (personal communication with Wang Jianbao, 2014). In this class, greyish white stoneware have been excluded and instead assigned to

Qingbai ware.

Sancai ware (S): Sancai ware includes triple coloured high fired potteries and green splashed high fired potteries.

Polychrome ware (P): Polychrome ware is an opposite term to monochrome ware. Here it refers to underglaze painted polychrome wares.

Blue and white ware (BW): This class contains two kinds of blue and white wares. The first is blue and white high fired potteries/stoneware, and the second is blue and white porcelain.

Qingbai ware (Q): Qingbai ware includes all Qingbai (bluish white), greyish white and Shufu (milky bluish white) stoneware and porcelain (Medley 1989:171-176).

Cizhou type ware (F): Cizhou type ware originally is a term for Chinese black-and-white sgraffiato slipped ware produced in the Cizhou kilns (Medley 1989:123-130, 134). In this dataset, all the black-and-white/black-and-brown sgraffiato ware produced in northern and southern China have been grouped into this class (Medley 1989:158-162).

Enamelled ware (E): Enamelled ware includes overglazed painted ceramics. The dataset contains e red-and-green enamelled stoneware (so-called polychrome overglaze decoration ware) (Medley 1989:132-133) and red-and-green/red enamelled porcelain.

Jun-celadon ware (J): Jun celadon ware has an important position in Chinese ceramic history. It has been called 'Northern Celadon' and is a form of stoneware of lesser quality with a lower fired body and bluish colour glaze due to the presence of small quantities of iron oxide combined with reduction firing. The addition of copper to the glaze results in red and purple stains within the celadon glaze after reduction firing (Medley 1989). Jun-celadon is very famous in China but no exported Jun wares have ever been found.

Other polychrome (O): This group contains items such as marbled earthenware ware (绞胎器), Fa-hua ware (法华器) and so forth.

The obvious limitation of these definitions is that they do not properly describe the important sub- divisions, as mentioned at the beginning of this section. This limitation means that the results of the present analysis can only be taken as a preliminary attempt to set out the broader trends, whilst acknowledging the numerous problems that will need to be solved before a final and fully reliable analysis might be possible.

(2) Calculation of the Quantities and Percentages of Ceramic Classes

In many cases similar classes of ceramics can be further divided into sub-classes. For example, during the 12th to 13th centuries, the Longquan kilns produced black bodied and pinkish green glazed celadon and also white bodied and bean green glazed celadon (Zhu 1989b:16-18). However, according to the definition of the celadon class for this dataset, these two celadon wares have been grouped as the same class, celadon (G), and they only occurred once at the Longquan kiln site in the 12th to 13th centuries. Because in many cases, the numbers or quantities of unearthed ceramic finds are not reported in the publications, it is currently impossible to obtain an accurate quantification of ceramic assemblages from many kiln sites (e.g. Zeng and Wu 1977, Li and Li 1980, Long 1992).

Each class has been counted only once for each kiln during each period and the number of classes produced has been counted. It is then possible to calculate the percentage that any class makes up of the total, giving some idea of the relative importance of each class in each period. For example, as shown by Table 6.1 in Appendix 4, the total number of kilns producing celadon ware is 25 and the total number of classes produced at kilns is 49; therefore, the percentage of celadon class in the 6th to 7th centuries is 51.0% (25/49=0.51). The counting and percentages of these classes from period to period have been shown in Tables 6.1 to 6.6 in Appendix 4.

These figures are obviously only crude approximations aimed at helping to elucidate the broader trends. It is hoped that this exploratory statistic calculated over a long period of time, from the 6th to 16th century, might give some indication of the changing trends in ceramic production across China. Such trends may be helpful in understanding the development of trade ceramics across the western Indian Ocean as a general background.

(3) The Percentages and Changes in Ceramic Classes

Based on Tables 6.1 to 6.6 in Appendix 4, the general percentage changes of each ceramic class during each period are presented in Table 2.5. And it can be seen that the number of classes from the 6th to 16th centuries increased (Figure 2.13). During the 6th to 7th centuries, there were only six classes of ceramics produced in China, mainly celadon, yellow glazed, white glazed and black glazed stoneware. A very small amount of underglaze painted ware and Jun-celadon ware was produced local kilns in Zhejiang, and the invention of these two classes occurred during the 6th century (Li 1979b, Gong 1989, Zhu 1995).

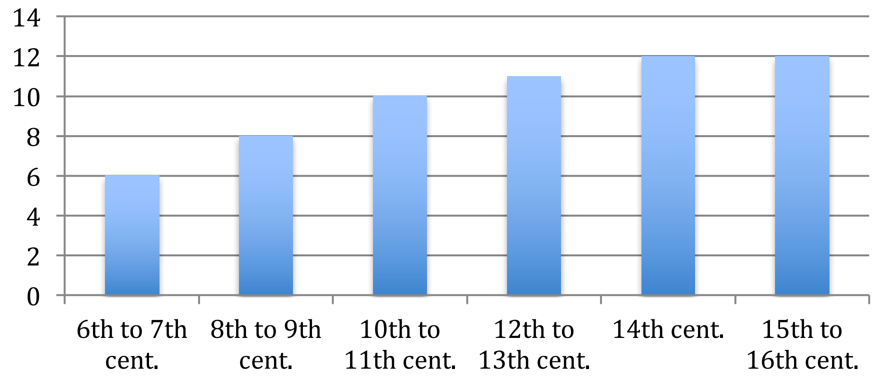


Figure 2.13: Numbers of ceramic classes from the 6th to 16th centuries.
(Based on Dataset 2)

Jun-celadon glazed ware was not widely manufactured in the 8th to 9th centuries, whilst Zhejiang Province was a centre for celadon ware production, and Celadon ware played a very important role in China. At the same time, Sancai and early blue and white stoneware was being produced in the Gongxian kilns of northern China.

The number of classes increased during the 10th to 13th centuries and reached a peak in the 14th century. This indicates that manufacturing techniques were continually developed through to this time. Although this dataset shows a slight decline in the number of ceramic classes in the 15th to 16th centuries, this is probably due to the monopoly of the ceramic industry by the Jingdezhen kilns and the Imperial Kilns, as noted previously. The advanced ceramic manufacturing techniques in Jingdezhen actually resulted in many new types of ceramics (Liu 1978:366-369, Kerr and Wood 2004), such as Doucai ware, Wucai ware[6] and monochrome ware seen during the Chinese Ming dynasty (Lv 1999, Kerr and Wood 2004:619). However, most of these newly invented classes were produced as Imperial Ceramics and have rarely been found as traded wares and ordinary quality wares.

(4) Limitations of the Exploratory Dataset Analysis

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[6] Doucai refers to dovetailing coloured porcelain and Wucai refers to five coloured porcelain. They both first appeared during the Ming dynasty and were produced as imperial wares.

It should be noted that when a kiln site produced two or more classes of ceramic wares this analysis could not incorporate this detail and provide an accurate result for the class percentage. It is hard to avoid this limitation because in many cases, the archaeological surveys and excavations could not provide quantities, numbers or percentages on the proportions of the different classes of ceramics produced.

(5) Discussion on the distributions and changes of ceramic classes

(i) Changes in celadon ware

Celadon not only has the longest history of Chinese stoneware production, but also plays the most important role throughout this long history. According to this analysis, however, it appears that the importance of celadon within the Chinese ceramic industry gradually decreased over time

From Table 2.5 it can be seen that the percentage of celadon wares (G) decreased from 51% in the 6th to 7th centuries to approximately 20% in the 15th to 16th centuries. Among all the kiln sites it can be clearly seen that the number and percentage of celadon and mixed-production producers (producing celadon and other classes of wares) decreased, while the number of non-celadon producers increased.

However, it is clear that celadon production, even during the 15th to 16th centuries when it was at its lowest point, still accounted for approximately one fifth of the entire ceramic industry and more than 30% of kiln sites were producing celadon ware. The decrease in the percentage of celadon was partly due to new classes of ceramic wares being invented in China after the 7th and 8th centuries. The high proportion of celadon ware production in China implies that its manufacture, from the early stage in the 2nd to 7th centuries to the later period in the 16th century, constituted a continual and fundamental industry within Chinese ceramics.

Table 2.5: The general collection of percentages of Chinese ceramic classes from the 6th to 16th centuries：

'-' indicates that ware of this class was not produced at this point in time; '0.0%' indicates that these classes had been manufactured in previous periods but were no longer produced at this point in time; *G= GREEN/CELADON (绿、青釉), Y= YELLOW/BROWNISH YELLOW WARES (黄、酱黄), B= BLACK WARES (黑釉), F= CIZHOU TYPE WARES (磁州风格), C= BLUE AND WHITE CERAMICS (青花), W= WHITE STONEWARES (白釉), P= POLYCHROME WARES (釉下彩), S= GREEN SPLASHED/SANCAI WARES (白釉绿彩、三彩), Q= QINGBAI WARES (青白), E= ENAMEL (釉上彩), J=JUN CELADON (钧釉器) and O= OTHER (其他种类) (according to Tables 6.1 to 6.6 in Appendix 4)*

Periods	**Classes**												**Total**
	G	**Y**	**B**	**W**	**S**	**P**	**C**	**J**	**Q**	**F**	**E**	**O**	**(approx.)**
6th to 7th cent.	51.0%	22.4%	10.2%	10.2%	-	2.0%	-	4.1%	-	-	-	-	100.0%
8th to 9th cent.	34.1%	26.0%	17.1%	13.8%	4.9%	2.4%	0.8%	0.0%	-	-	-	0.8%	100.0%
10th cent.	39.7%	17.8%	11.0%	19.2%	4.1%	0.0%	0.0%	0.0%	4.1%	2.7%	-	1.4%	100.0%
11th to 12th cent.	29.1%	17.1%	15.4%	13.2%	2.7%	1.7%	0.0%	2.2%	12.1%	3.8%	-	2.7%	100.0%
12th to 13th cent.	21.4%	14.6%	19.4%	12.1%	1.0%	1.5%	0.0%	3.4%	14.6%	6.8%	1.9%	3.4%	100.0%
14th cent.	22.0%	8.7%	16.5%	13.4%	1.6%	2.4%	0.8%	6.3%	16.5%	6.3%	3.1%	2.4%	100.0%
15th to 16th cent.	19.0%	3.4%	10.3%	13.8%	1.7%	1.7%	27.6%	1.7%	12.1%	3.4%	3.4%	1.7%	100.0%

Period	6th to 7th cent.		8th to 9th cent.		10th to 12th cent.		12th to 13th cent.		14th cent.		15th to 16th cent.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
None	2	7.4%	11	20.8%	27	33.8%	38	46.3%	27	49.1%	19	63.3%
Cel	10	37.0%	13	24.5%	18	22.5%	9	11.0%	7	12.7%	7	23.3%
Mix	15	55.6%	29	54.7%	35	43.8%	35	42.7%	21	38.2%	4	13.3%
Total	27	100%	53	100.0%	80	100.0%	82	100.0%	55	100.0%	30	100.0%

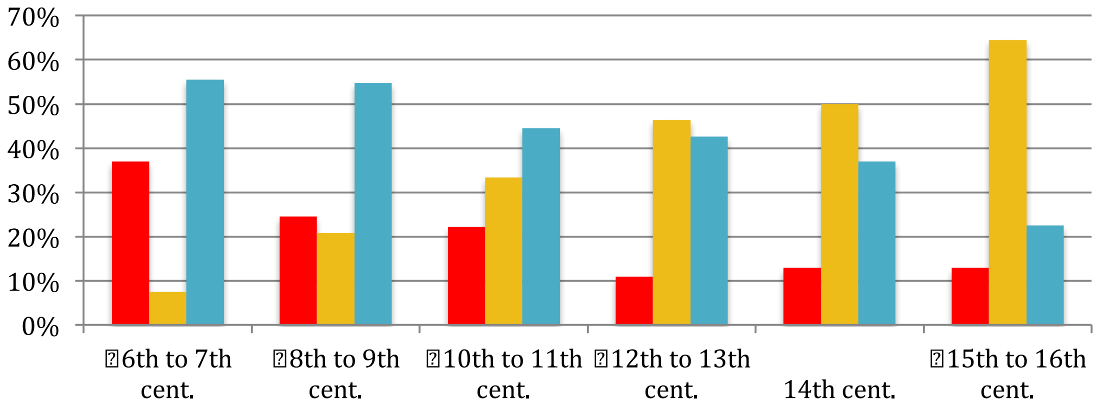


Figure 2.14: The changing percentages in celadon and non-celadon producers from the 6th to 16th centuries:

According to Datasets 1 and 2 (Appendices 1 and 2) and based on results of Table 6.1 to 6.6 (Appendix 4), the table and figure above shows the changing quantities and percentages of celadon producers and non-celadon producers in the period from 6th to 16th centuries.

Cel (red columns) = percentage of celadon producers; None (yellow columns) = percentage of non-celadon producers and Mix (blue columns) = mix-production producers. The lower figure shows the percentage changing based on this table.

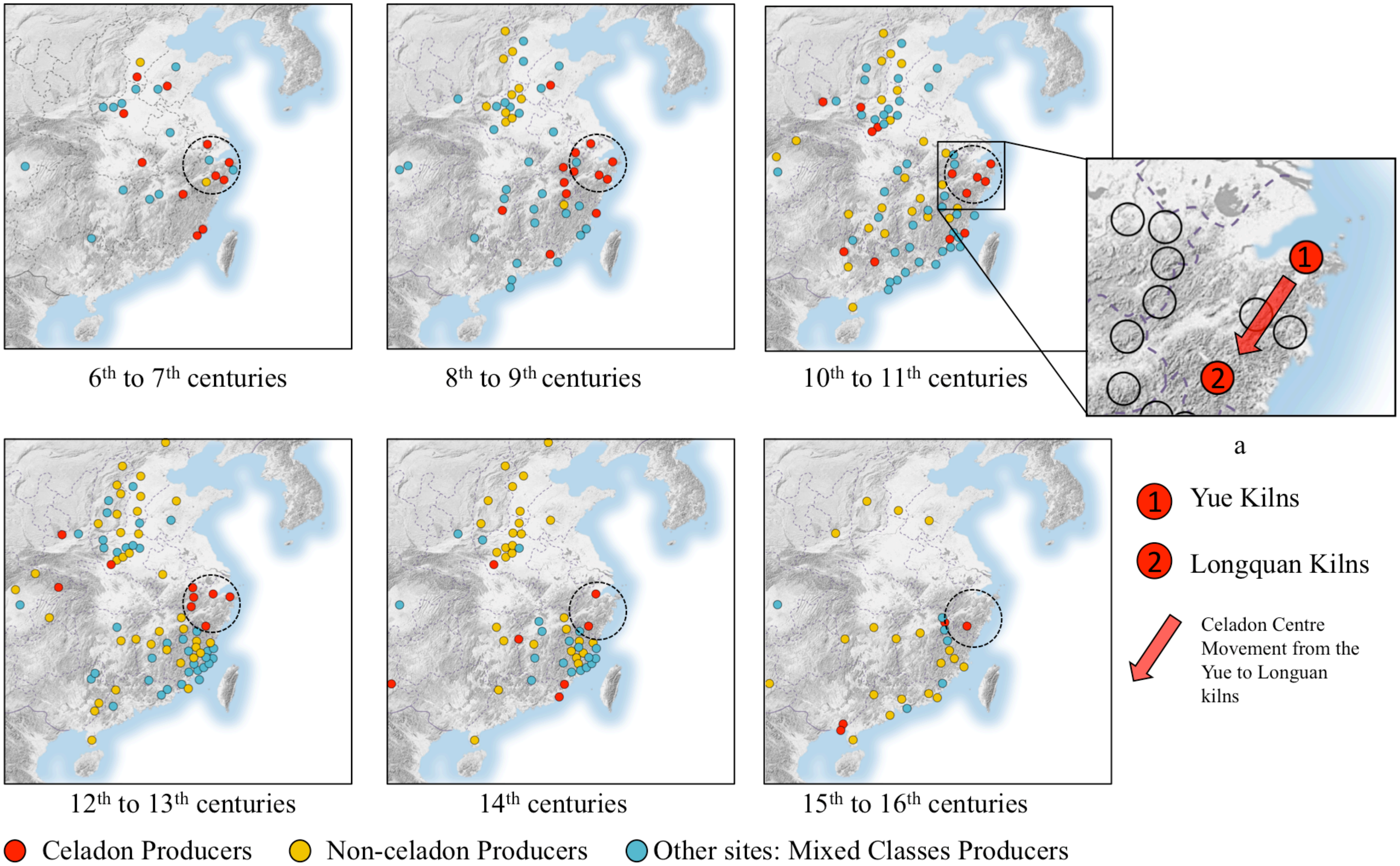


Figure 2.15: Distributional change of celadon producers and non-celadon producers in the 6th to 16th centuries.

Dotted circles show the celadon industries in Zhejiang Province (Drawing by Ran Zhang)

Figures 2.14 and 2.15 show the distributional change in celadon producers (red-coloured sites) and non-celadon producers (yellow-coloured sites). It can be seen that the number of celadon producers increased to the 10^{th} to 11^{th} centuries and then decreased to the 16^{th} centuries. The Zhejiang area remained a celadon production centre throughout (the dotted circle area). Figure 2.15a shows the locations of the Yue and Longquan kilns, and it can be seen that a movement in the celadon centre occurred in Zhejiang during the 12^{th} to 14^{th} centuries, such that the Longquan kilns rose in southern Zhejiang, while Yue kilns declined.

(ii) Change in Qingbai ware

The class of Qingbai ware was first invented in local kilns in the provinces of Anhui and Jiangxi in southern China in the 10^{th} century (Xue and Liu 1996, Yang et al. 2006). Production spread across southern China during the 11^{th} century, and the Hutian kilns in Jingdezhen became famous Qingbai producers from this time. In the 15^{th} century the Jingdezhen kilns were famed for their Qingbai stoneware and Shufu porcelain.

According to Table 2.5, Qingbai ware (Q) did not play a particularly important role within the Chinese ceramic industry. During the 11^{th} to 16^{th} centuries the occurrence rates are around 12% to 17%, and this decreased during the 15^{th} to 16^{th} centuries. From Figures 2.16 and 2.17, it can be seen that the Qingbai ware was never produced in northern China, but in the 12^{th} to 14^{th} centuries was widely manufactured, together with other classes such as celadon or yellow glazed wares, in the littoral area of the provinces of Fujian and Guangdong.

Figure 2.16 reveals that the percentage of kiln sites only producing Qingbai ware during the 10^{th} to 16^{th} centuries was low, at around 7%, whilst the percentage of non-Qingbai ware producers decreased during the 10^{th} to 14^{th} centuries, and mixed-producers increased during this same time. The 15^{th} to 16^{th} centuries saw the decline of Qingbai ware producers, both single and mixed Qingbai producers, while the percentage of non-Qingbai ware producers notably increased.

Period	10th to 12th cent.		12th to 13th cent.		14th cent.		15th to 16th cent.	
	No.	%	No.	%	No.	%	No.	%
None	58	72.5%	52	63.4%	34	61.8%	23	76.7%
QBW	5	6.3%	5	6.1%	4	7.3%	1	3.3%
Mix	17	21.3%	25	30.5%	17	30.9%	6	20.0%
Total	80	100.0%	82	100.0%	55	100.0%	30	100.0%

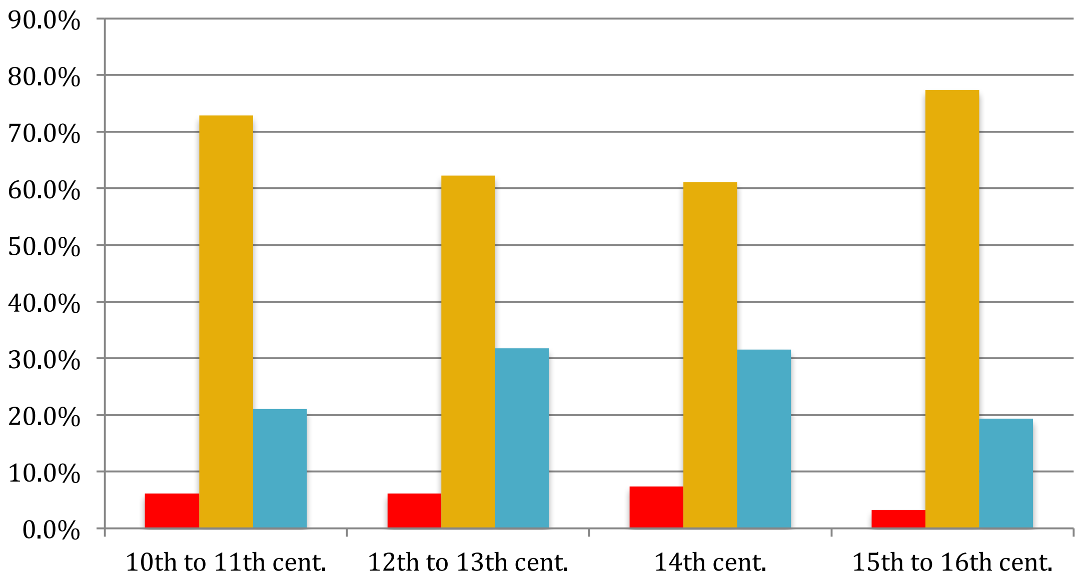


Figure 2.16: The changing percentages in Qingbai wares and non-Qingbai producers from the 10th to 16th centuries.

According to Datasets 1 and 2 (in Appendices 1 and 2) and based on results of Table 6.3 to Table 6.6 (in Appendix 4), this table below shows the changing quantities and percentages of Qingbai producers and non-Qingbai producers in the period from 10th to 16th centuries.

QBW (red columns) = percentage of Qingbai ware producers, None (yellow columns) = percentage of non-celadon producers and Mix (blue columns) = mix-production producers. The figure at lower part shows the percentage changing based on this table.

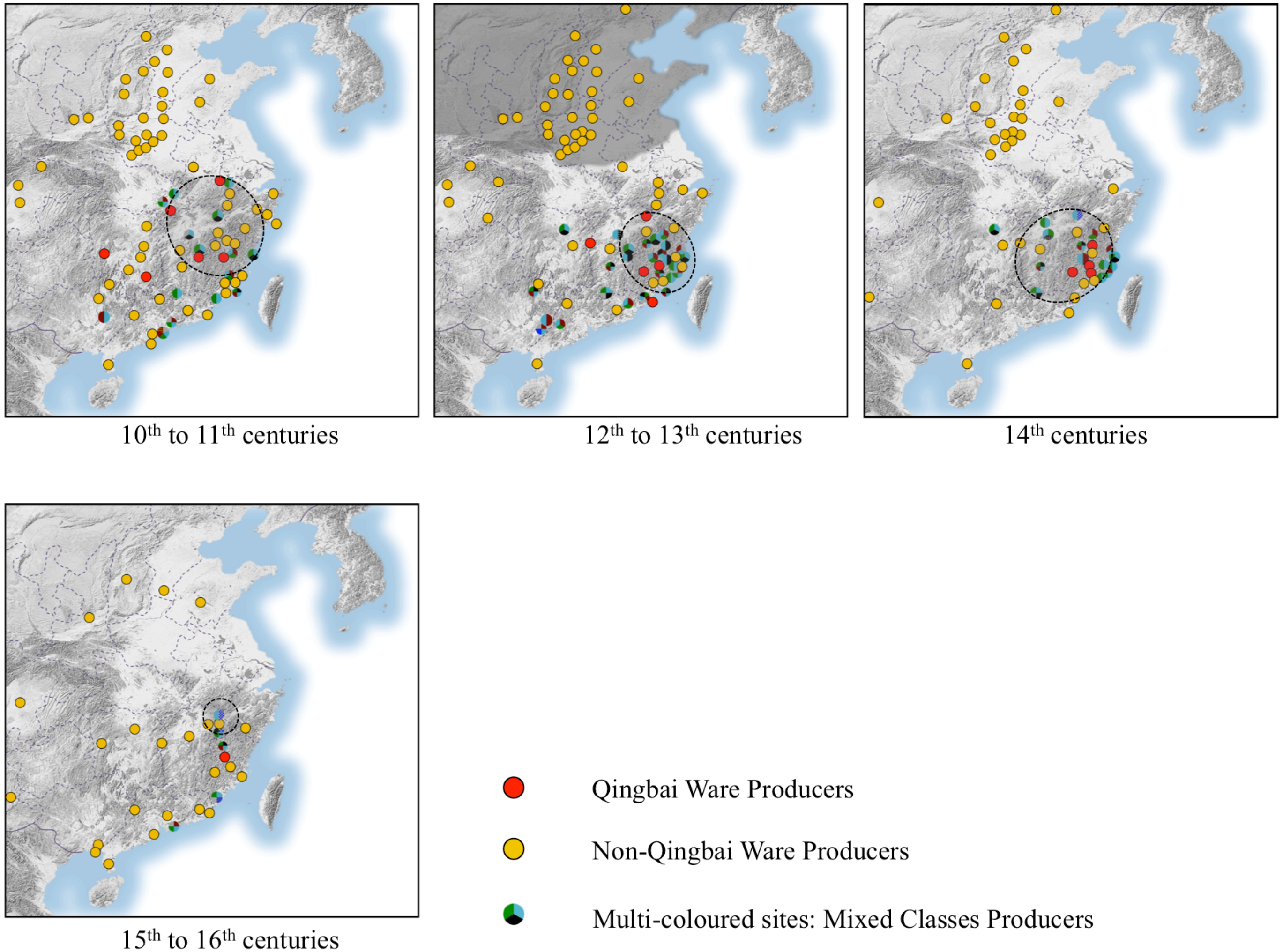


Figure 2.17: Distributional change of Quingbai producers and non-Quingbai producers in the 6th to 16th centuries. Dotted circles show the Qingbai industries.

(Drawing by Ran Zhang)

It can be therefore reasonably be suggested that Qingbai ware within the Chinese ceramic industry played only a limited role. Its absence in northern China, the low numbers of Quingbai ware-only producers and the wide distribution of kilns in the littoral area imply that demand for this class came from the port cities and was tightly linked to foreign trade.

(iii) Change in Blue and White Ware

The first application of cobalt blue occurred in northern China, and the Gongxian kilns in Henen Province have been well demonstrated to be an early blue and white stoneware producer in the 8th to 9th centuries. Some examples from the archaeological excavations of the Gongxian kilns and the Belitung shipwreck are these early blue and white high-fired potteries with a stoneware-like body (HNSWWKGYJS and ZGWWYJS 2007, Krahl et al. 2010, HNSWWKGYJS and ZGWHYCYJY 2011).

Although cobalt blue was first introduced and applied to Chinese ceramic wares as early as the 8th to 9th centuries, it appears that the continual production of blue and white ware did not occur until the 14th century, when porcelain was vastly manufactured in Jingdezhen (Figure 2.18). The idea that Yuan blue and white porcelain was suddenly manufactured only at local kilns in Jingdezhen has been the subject of much debate. It has been argued that the re-invention of blue and white ware in China was through direct teaching by Persian potters who were living in Jingdezhen (Huang and Huang 2012) or that it was part of the imperial tribute from the Fuliang Ciju (浮梁瓷局 Porcelain Bureau in Fuliang county) in Jingdezhen to the Yuan rulers and was potentially made by skilled northern Chinese potters from the Cizhou kilns (Liu 1981b:72, 1982, Lin 2009).

From Figure 2.18 it can be seen that the successful re-invention of blue and white ceramics in the 14th century widely inspired other ceramic kilns, and by the end of the 15th to 16th centuries, blue and white producers were distributed across southern China.

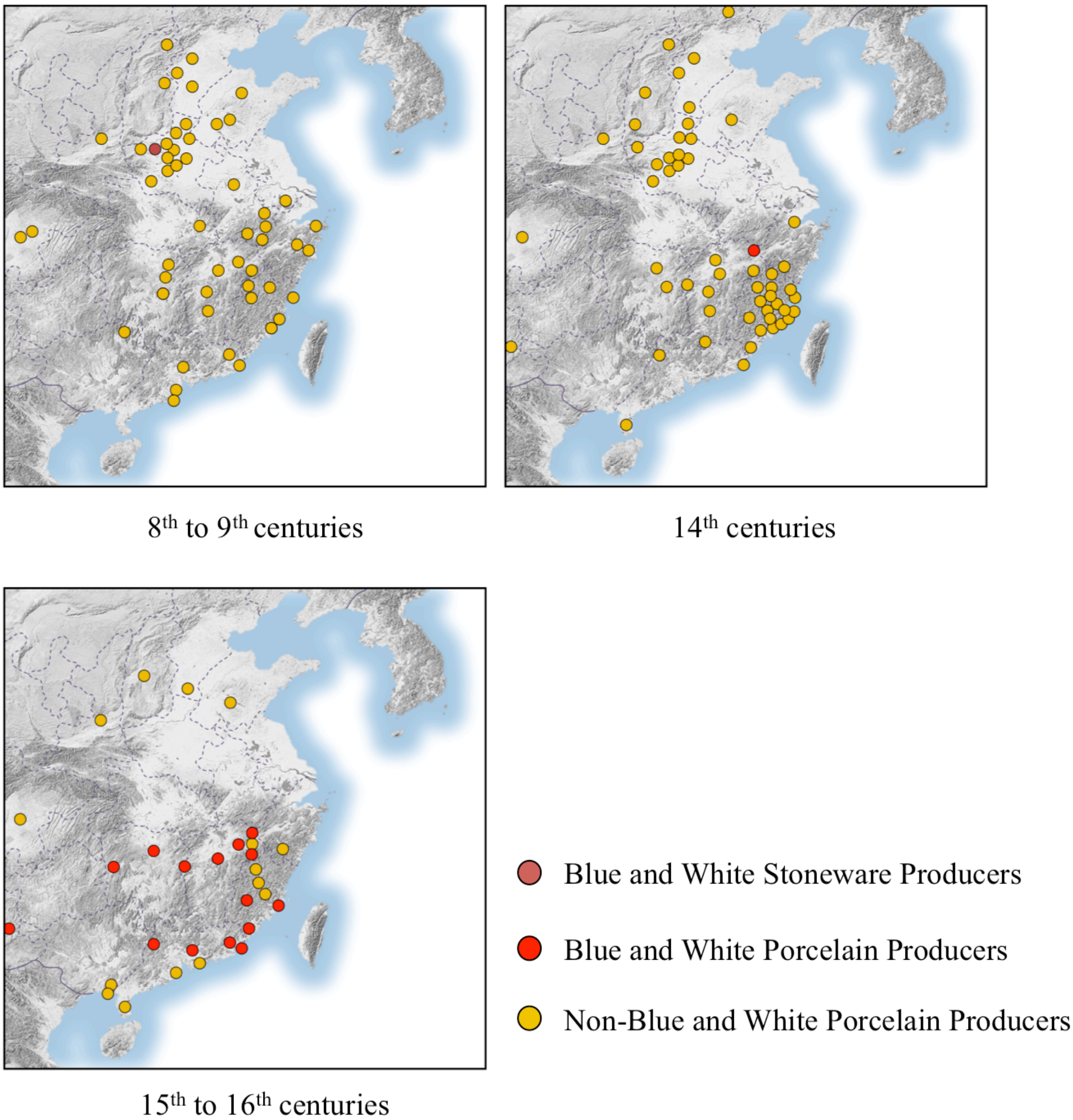


Figure 2.18: Distributional change of blue and white stoneware (8^{th} to 9^{th} centuries) and blue and white porcelain ware (14^{th} to 16^{th} centuries).
(Drawing by Ran Zhang)

The percentage of blue and white ceramics (C) in Table 2.5 demonstrated a surprising increase, from around 1% in the 14^{th} century to nearly 30% in the 15^{th} to 16^{th} centuries. This confirms that the popularity of blue and white porcelain mainly occurred during the 15^{th} to 16^{th} centuries.

(iv) Changes in Mixed Classes Producers

It is interesting to note that according to this analysis ceramic kilns normally produced one to six different key classes of ceramic wares. For example, the local kilns in Zhejiang Province normally produced only one class of celadon ware, yet these kilns were famous for many different classes, such as the Jingdezhen kilns during the 14th century (Liu 1981b:71). Some kilns produced many classes of ceramics but were normally known for their best-quality products. For example, the Xing and Ding kilns were famous for their white stonewares but they also produced Sancai, black glazed, green splashed wares and so forth (Feng and Li 2005a). Can a development principle for these mixed classes producers be identified?

Before the northern Chinese ceramic industry declined in the 15th to 16th centuries, it can be seen that there was a mixed-class producer centre and local kilns normally produced more than four classes (Figure 2.19). This may suggest that in order to supply the demands of the northern Chinese capital cities and market, multiple-class ceramic production was required.

However, in southern China, a mixed-class producer centre was formed much later during the 11th to 12th centuries, in the provinces of Fujian and Guangdong. It appears that local kilns producing multiple classes of ceramics were aiming to supply the different demands of the foreign market, and may have had strong links to trade ceramics. It can be seen that this centre in south China reached its peak in the 12th to 13th centuries, when Song China had lost the northern Chinese territory and was trying to increase its foreign trade (Chao 2012:12-13).

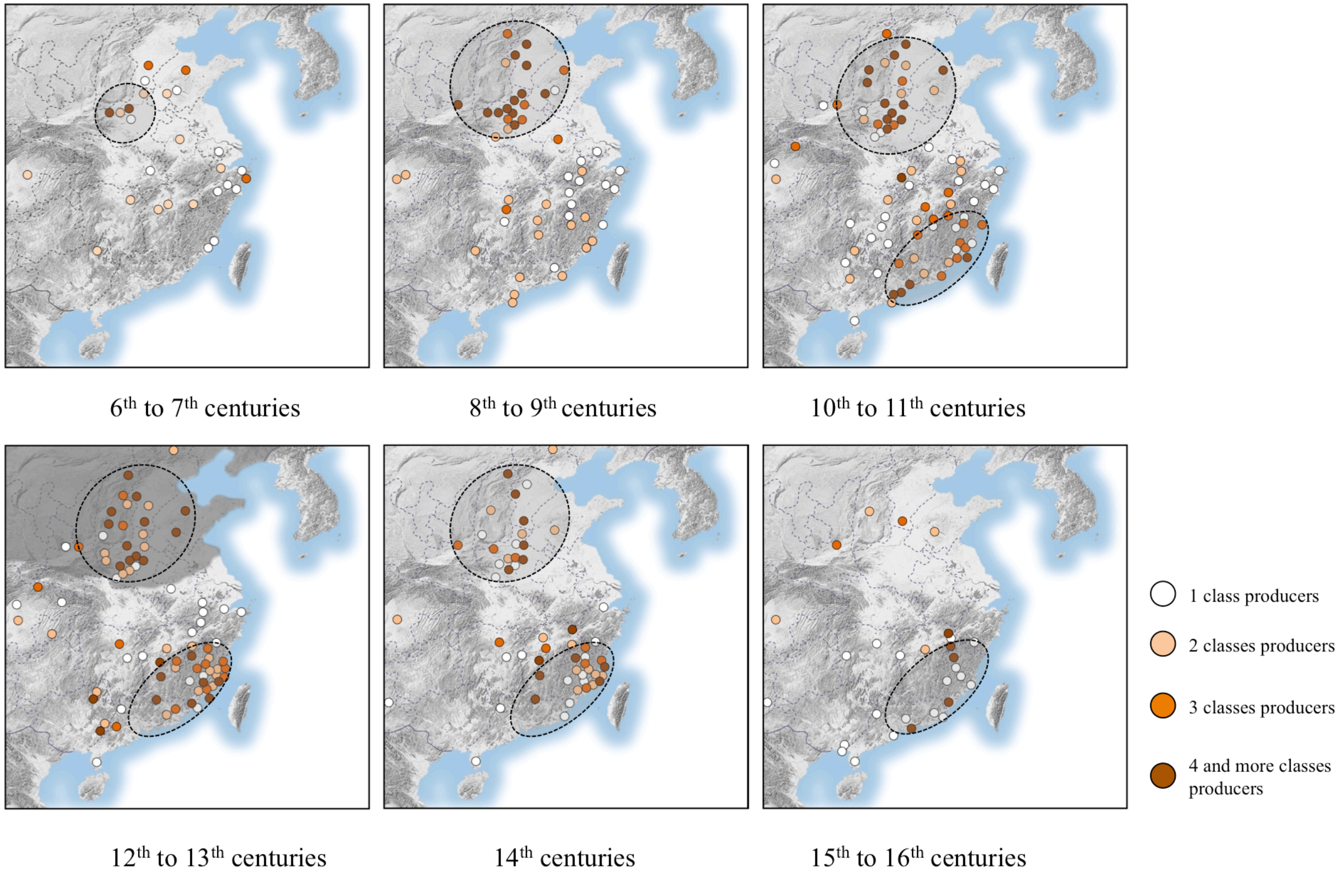


Figure 2.19: Distribution of mixed class producers in the 6^{th} to 16^{th} centuries. Dotted circles show the central areas of mixed class producers with manufacturing four or more classes of ceramics.

(Drawing by Ran Zhang)

2.6 Conclusion of Chapter 2

Using historical and archaeological evidence this chapter has attempted a broad overview of Chinese ceramic industrial patterns from the 6^{th} to 16^{th} centuries.

Because of the problems of a biased pattern emerging from the historical records, it has been questioned how reliable the historical descriptions of the Chinese ceramic industry were before the early 15^{th} century, a period when relatively few historical sources are available. Using archaeological evidence from over 200 kiln sites in China that date from the 6^{th} to 16^{th} centuries, this chapter has attempted to deal with this problem by bridging the gap resulting from this historical bias. In order to take a first step towards a long-term and comprehensive understanding of ceramic industrial patterns, this chapter has compared the distribution of ceramic kilns and changes to the classes of ceramic produced using two datasets collected by the author. These datasets have provided useful and interesting results in an exploratory analysis of Chinese ceramic industrial patterns. Although the analysis has produced results which largely confirm current knowledge, they show how a more robust and quantifiable understanding of developments might be produced as the data set improves with further excavation, survey and publication.

From the exploratory analysis of the distribution of ceramics during different periods, it can be seen that the southern Chinese coastal provinces, such as Guangdong and Fujian, provided a good geographical location for the trading of ceramics and this led to a local ceramic industry that peaked in the 8^{th} to 9^{th} centuries. During the 11^{th} to 12^{th} centuries there was movement of the coastal and export ceramic manufacturing centre from Guangdong to Fujian. In the late 14^{th} century the northern Chinese ceramic industry declined and the Jingdezhen kilns began to monopolise the Chinese ceramic industry. In the provinces of Guangdong and Fujian, the export ceramic industry again played an important role during the 16^{th} century, especially after Chinese trade re-opened in 1567 AD (Chao 2012:212-224).

The second aim of this exploratory analysis was to attempt to explore changes and trends in the ceramic classes produced in the 6^{th} to 16^{th} centuries. This confirms that celadon ware played an important role throughout this long period of time and the finest celadon producers were mainly based in Zhejiang Province in southern China. However, the importance of celadon ware can be shown to have gradually decreased over time. Qingbai celadon ware was first produced in the 10^{th} century in southern China and then quickly spread to other south Chinese kilns. In the 14^{th} century, the sudden rise in the production of blue and white porcelain in Jingdezhen provides clear evidence of its popularity, which continued into the 15^{th} to 16^{th} centuries when a large portion of south Chinese kilns produced it.

This analysis therefore provides a new perspective on the development of the Chinese ceramic manufacturing industry. By using only archaeological datasets and exploratory statistics, this chapter has attempted to provide a clearer mapping of Chinese ceramic industrial patterns. This is both important and helpful for understanding the identification and dating of Chinese trade ceramics (see Chapter 3), for creating a classification system for Chinese trade ceramics (see Chapter 4) and as a more measurable yardstick against which the occurrence of trade ceramics can be compared.

CHAPTER 3: AN OVERVIEW OF CHINESE CERAMIC TRADE PATTERNS IN THE WESTERN INDIAN OCEAN FROM THE 6TH TO THE 16TH CENTURIES

3.1 Introduction

As described in Chapter 2, there were complicated and dynamic industrial systems behind the manufacture of ceramics during the 6th to 16th centuries in ancient China. The questions raised in this chapter are which different classes of Chinese ceramics were traded to the western Indian Ocean and when were they traded?

Attempts to investigate these questions have been made by different scholars using different approaches (for some general studies, for example: Mikami 1969, Rougeulle 1996, Kennet 2004, Priestman 2005); however, little research has focused on the long-term and wider regional patterns of Chinese ceramic trade in the western Indian Ocean. In addition, no attempt has been made to understand these patterns through exploratory statistical analysis of collected datasets. Using a dataset collected by the author which incorporates over 120 archaeological sites in the coastal areas of India, Sri Lanka, the Gulf, Oman, Yemen, the Red Sea and the East Africa, this chapter aims to reconsider the trends and changes in Chinese trade ceramics from the 8th to 15th centuries by exploring the quantitative changes in sherd numbers and classes. It is hoped that using these results will help to re-describe and confirm our understanding of the Chinese ceramic trade in the western Indian Ocean.

This chapter consists of four main sections: (1) a review of the key historical events in China and western Indian Ocean countries linked to maritime trading. This section does not aim to provide a detailed historical study of ancient China and the Near East but rather to present a broad background for understanding the trade patterns between China and the Islamic world from the 8th to 15th centuries. (2) A review of the key studies of Chinese trade ceramics and their trade in the western Indian Ocean, which explores some of the limitations of past research. (3) This section introduces the site and trade ceramic information obtained from western Indian Ocean archaeology. The re-thinking of the methodology of this chapter and its limitations will be also explained in this section. (4) Using the collected dataset an attempt is made to identify patterns in Chinese ceramic trade, namely the traded ceramic classes and trade routes across the western Indian Ocean.

This chapter helps to increase our understanding and in turn allows the exploration of long-term changes in Chinese ceramic classes and distribution in the western Indian Ocean. The changes in the classes of Chinese ceramics traded in the western Indian Ocean are linked to the classification presented in Chapter 4.

3.2 Historical Background

Historians have made many attempts to explore the societies and civilisations surrounding the Indian Ocean, from as far as China to the east and the Mediterranean to the west. Through their work and suggestions, it is not surprising to see that some scholars have suggested that a so-called 'world-system' of early globalisation occurred as early as the 12th century, before Europeans entered the Indian Ocean (cf. Abu-Lughod 1989, Chaudhuri 1985, Hourani 1995, Frank 1998, Lo 2012). Our historical understanding of these early world systems have been gleaned from a few historical sources from different perspectives on political events and historical studies (e.g. Abu-Lughod 1989, Kauz and Ptak 2001, Deng 2002), ship building techniques (e.g. Hourani 1995: Chapter 3, Deng 1997, 1999: Chapter 2), geographical re-mappings (e.g. Nebenzahl 2004, Park 2012), and of course trade activities (e.g. Steensgaard 1974, Chaudhuri 1985). The topic of trade and traders in the Indian Ocean and their geographical extensions has received notable interest, especially as long-distance trade has always played an important role in the study of history (Chaudhuri 1985:10).

Whilst it is unnecessary to review or repeat all the historical arguments and events described in these studies, an outline of the historical background through historical trade records and significant events is helpful to this thesis in order to re-build the classification of Chinese trade ceramics and also to interpret the value changes in Chinese ceramics traded from China to the Indian Ocean area. Therefore, this section aims to present the historical background of trade policies and to provide descriptions of trade patterns in the western Indian Ocean. In comparison with previous historical studies, this section aims to provide a broad overview of the 7th to the 16th centuries, and covers a large geographical area from Islam to China, so it is necessarily a broad summary.

This section has four parts relating to historical contexts that have been well discussed by historians, such as Hourani (1995), Chaudhuri (1985), Abu-Lughod (1989), Ptak and Kautz (2001), Lo (2012) and so forth. With additional information from archaeological missions and studies, these four parts aim to introduce the changing patterns of western Indian Ocean trading with China, from its sudden rise in the 8th century to the 16th centuries, when the first Europeans arrived in this area.

The first part aims to introduce the trade route switch from land to sea and the key geopolitical and historical events underlying this switch will be outlined. The second part introduces the period when the unique power of the Abbasid Caliphate in Indian Ocean trading was shared with other powers, such Oman, Aden and the Fatimids, from the 11th to 12th centuries; this significant change has been called a transitional phase (Rougeulle 1996:167). The third part introduces the Chinese role in western Indian Ocean trade, from a conservative receiver in the 8th century to a strong (maybe) trader in the 15th century. In the final part the entry of European merchants and the re-opening of Ming China is described together with the beginnings of trade in the Indian Ocean after the 16th century.

3.2.1 Decline of the Silk Road and the rise of maritime routes

The rise of Tang China in the early 7th century has been regarded as one of the highest points of Chinese history; meanwhile the Prophet Muhammad and his followers rose to power over the merchants of Mecca. The expansion and rise of China and Islam marked a fresh beginning in the trade between China and Arabia (Chaudhuri 1985:34, Hourani 1995:61-62). It can be suggested that this was a starting point in the switch of trade routes from the land to the sea. Just 150 years later, around the middle of the 8th century, a couple of political events occurred in China and Central Asia which resulted in the decline of trade along the Silk Road, the land-based trade route from Chinese Chang'an to the West (Lin and Zhang in press). This increasingly dangerous overland route became disturbed by wars and an unstable geopolitical environment, which led to the development of trade via the cheaper, safer and better-protected sea routes of the Abbasid Caliphate (Lewis 2009:161-162). This marks the start of the large-scale ceramic maritime trade between China and the West.

Arab seafaring had a long history, which was described by Hourani (1995), who noted that before the 2nd century AD, no long-distance voyages had been accomplished by Arabs due to the lack of good harbours and natural resources, such as fine wood and iron ore for building strong seagoing ships (Hourani 1995:5). Although it is still in doubt, it can be suggested that before the rise of Islam, Arab seafaring based on the Gulf had expanded only as far as the Mediterranean, East Africa and India (Guy 1986:4-9, Wang 1988, Hourani 1995:38).

Although the maritime trade route from the Gulf to China existed during the Sasanian period (Whitehouse and Williamson 1973, Chaudhuri 1985:37, Piacentini 1992:124-125, Hourani 1995:38), it was not always in prosperity (e.g. sometimes with regional declines, see Kennet 2007) and the Silk Road played a more important role in trade between the East and West. This has been suggested by archaeological studies on the distribution of Sasanian silver coins in China, where nearly 2,000 Sasanian coins have been found with the majority unearthed in the modern province of Xinjiang and in northern China (Xia 1974, Sun 2004). In total, 468 coins date to the Peroz period (459-484 AD) and most were unearthed from 18 tombs dating from the 5th to the early 8th centuries. In contrast, only three tombs dated to the late 5th century, yielding no more than 20 coins, have been found in Guangdong (Sun 2004:42).

After the middle of the 8th century, the establishment of the Abbasid Caliphate enabled the further development of Arab seafaring in the Indian Ocean and extended their reach as far as China, thereby initiating regular maritime trade activities (Hourani 1995:Chapter 2, Li 1996).

(1) The Battle of Talas (751 AD)

The middle of the 8th century was the point when the trade route began to shift from land to sea. This may have been because the two expansionist empires of the Abbasid Caliphate and Tang China grew enmeshed in complicated political conflicts. During the reign of Tang Xuanzong (唐玄宗) (712-756 AD), Tang Chinese territory reached its maximum, but just few years before the death of Xuanzong, Chinese armies lost the Battle of Talas, the first war between China and Islam (Lewis 2009:158, Park 2012:191-192). Historical records cannot provide a fixed and reliable number for the Chinese losses; however, it appears that no fundamental harm or destruction was suffered by the Tang Chinese military, political and economy power inside China. This battle also brought about a limited positive impact for the victorious Abbasid Caliphate, where it is simply recorded via the description; 'decisive defeat of Tang China' (Bartol'd and Bosworth 1988:195-196, Ge 2003:51).

The loss of the Talas Battle had a negative impact on the Tang Chinese geopolitical economy, and military power in Central Asia began to decline gradually. The historical significance and impact of this battle remains a subject of debate (Ge 2003:51), although Chinese control of Central Asia was gradually lost to Tibet and the Uighurs from 763 AD onwards (Franke and Twitchett 1994:5-6, Lewis 2009:157-158).

(2) The rebellion of An Lushan (755-763 AD)

Losing control of the Silk Road was not simply due to this battle, which has even been described as a more of a 'skirmish' (McNeill 1998:227). Another important event, the An Lushan Rebellion (安史之乱), strongly influenced and fundamentally limited Chinese control of the land trade route and also the economic patterns of China.

The An Lushan Rebellion occurred as a result of a number of complicated reasons, such as the rise of autonomous provinces and the loss of central authority rights in the later period of Xuanzong's reign (Lewis 2009:42-43). In 755 AD An Lushan (安禄山) occupied Luoyang City, the eastern Capital of Tang China, however he was blocked from proceeding west by the defences at Tongguan Pass (潼关) near Chang'an City, where the Tang court armies had gathered to suppress the An Lushan Rebellion. An Lushan gradually took control of most parts of the modern-day provinces of Henan and Hebei and in 756 AD claimed that he had been authorised as the new Emperor.

In the following six months some of the rebel armies were defeated by Tang loyalists; however, Xuanzong was persuaded by his favourite young courtesan, Yang Guifei (杨贵妃), and his minister Yang Guozhong (杨国忠), to pursue an eastward impetuous assault through the Tongguan Pass, where the Tang army became trapped in a narrow defile which resulted in their destruction. By the time An Lushan's rebel armies occupied the capital Chang'an, Xuanzong had fled to Sichuan Province and been stripped of his position by his heir, Emperor Suzong (唐肃宗) (711-762 AD) (Zhu 2000:579-581, Lewis 2009:43-44).

In the following year An Lushan was assassinated by his son and his followers but the rebellion continued. Shi Siming (史思明), another leader of the rebel armies, continued to command the troops against the central Tang court, but in 763 AD the rebellion was finally suppressed after Shi Siming was assassinated by his son and the Tang armies finally defeated the rebel armies during this internal conflict (Zhu 2000:581-582).

Through the loss of the capital city and the long period of war, traditional Chinese scholars believe that the An Lushan Rebellion marked the beginning of a turbulent period, which ultimately triggered a terrible war and many more rebellions in the following hundred years (Hu 1996:365). It is true that the economy and culture of the

Tang rule were partly damaged by the An Lushan Rebellion (Zhu 2000:579) and the industry and economy of northern China was ruined during the rebellion (Wei 1999:53, DeBlasi 2001:7). However, it has also been deemed as having a positive impact on the movement of the economic centre, which was the turning point in the development of the Tang exporting trade (Chen 1981:96, Lewis 2009:2)

(3) Short Summary: decline of the land trade and rise of the maritime trade of China

It can be seen that the Talas Battle and the An Lushan Rebellion changed not only the Tang Chinese economy, manufacturing industries and trade in north which started to decline, but also the control of power along the Silk Road was lost. These historical and geopolitical changes resulted in the opportunity for the development of the southern Chinese economy, and ceramic, shipbuilding, textile and minting industries were quickly developed (Franke and Twitchett 1994:4-5, Wei 1999). Following the loss of control of the Silk Road, the port cities in southern China, such as Guangzhou and Yangzhou, became strongly involved in maritime trade that was well protected by the Abbasid Caliphate (Lewis 2009, Kauz 2010:117-149, Park 2012).

It is therefore reasonable to suggest that by the middle of the 8th century AD, the traditional land-based Silk Road had declined while maritime trade between China and Islam had increased in volume and become more important. These events hint that the sudden rise in the large-scale Chinese ceramic trade had its own complicated reasons: the decline in land route trade and the northern Chinese economy provided the opportunity for maritime trade and manufacture in southern China. At the same time, as mentioned in Chapter 2, technical improvements in Chinese ceramic manufacturing and industrial development also occurred in the 8th to 9th centuries. This situation provided one of the most important prerequisites for the rise of the Chinese ceramic trade in the Indian Ocean (Zhang 2013, Lin and Zhang in press).

3.2.2 The decline of Siraf and the switch in trade routes

As noted previously, the Islamic expansion of trade in the Indian Ocean involved

China from the middle of the 8th century onwards, while traditional land route based trade gradually declined. During the 8th to 10th centuries, the Gulf played a leading position as the trading centre that connected China, India, Africa and the Mediterranean (Hourani 1995:Chapter 2). The lower reaches of the two combined rivers of Mesopotamia had been urbanised since Babylonian times. And during the Sasanian period, it has been indicated by archaeological evidence that the maximum extent of land-usage and population density was reached. This was supported by a massive state-sponsored canalisation programme, which brought the unutilised land into use for the first time (e.g. Adams 1962, 1965, 1981, Neely 1970, 1974, Wenke 1975-76, Christensen 1993). Whilst in the 8th century AD, the newly founded capital of the Abbasid Caliphate, Baghdad, was developed into a true commercial emporium, as was the port city of Basra with links to port cities such as Siraf and Sohar (Chaudhuri 1985:46-47).

This situation altered during the later 10th century with the rise of the Buyyids and the balance of networks for trade in the western Indian Ocean switched from the Gulf to the Red Sea from early in the 11th century (Aubin 1963, Cahen 1970:183-185, 190, Chaudhuri 1985:58, Rougeulle 1996:167). It is well known that the Saljuqs, Oghuz and Mongols invaded Iran, each of which was accompanied by pillage and destruction to cultivation during the period from the 11th to 13th centuries. After that the economy of Iran underwent an upsurge, as a result of the reforms of the Il-Khans in the late 13th century, it did not however re-cover its pre-1220 level (Boyle 1968:483-500). Following the conquering of China in 1280 AD and the occupation of large parts of Eurasia, the Mongol Empire participated in both land and sea route-based trade from the east to west in the 14th century, as described in the historical accounts of Marco Polo (1254-1324 AD), Wang Dayuan (汪大渊) (1311-1350 AD) and Ibn Battuta (1304-1369 AD) (Ibn Battuta 1929, Polo 1938, Wang 1981, Chaudhuri 1985:54-56, Abu-Lughod 1989).

(1) Maritime trade under the Abbasid Caliphate (the 8th to 11th centuries)

It is hard to describe the prosperity of Basra as there is little archaeological evidence (Rougeulle 1996:162); however, from the historical accounts it is clear that Basra played an important strategic role in the military protection of the Caliphate from sea attacks by Oman or even Hindustan, and was also the major trading port that linked the city to Baghdad, the later political and economic base of the Abbasid Caliphate (Chaudhuri 1985:47). Basra was described by al-Mansur (1901:206-207) as:

> *This is the Tigris, there is no obstacle between us and everything on the sea can come to us on it.*

The Indian Ocean in the 8th to 10th centuries was notable for the smooth and long distance voyages from China to the Gulf (Hourani 1995:61). In contrast, under the Islamic expansion, merchants and caravaneers from the Red Sea struggled to reach Damascus and other western destinations other than Yemen when bringing goods from the east. The Red Sea route during this period was never safe due to the existence of piracy (Chaudhuri 1985:42). The lack of historical resources means that archaeological finds of Chinese ceramics from Athar on the south western coast of Saudi Arabia and Aqaba on the Gulf of Aqaba may provide a very limited pattern demonstrating the prosperous trade with Red Sea merchants. It has been suggested that long distance trade with China via the Red Sea was possibly in the hands of Gulf traders (Rougeulle 1996:166-167).

Through archaeological evidence the importance of Siraf in the Gulf may provide good evidence of the heyday of long distance Islamic trade (Tampoe 1989). The historical descriptions of Siraf are curiously poor in comparison with those for other large cities in the Gulf. However, the few paragraphs contained in historical accounts reveal that despite the poor geographical environment, Siraf was a town of considerable size as large as Shiraz. This port was sufficiently attractive for long distance merchants to trade here (Chaudhuri 1985:48), and rich merchants and people from Siraf funded the construction of a great Friday mosque more than 2,000 square metres in size and raised on an artificial terrace two metres high, which was completed around 820 AD (Whitehouse 1979:56, Rougeulle 1996:162).

(2) The gradual decline of Siraf and the switch in Sea Trade Route (11th to 13th centuries)

From the 8th century onwards Tang Chinese merchants needed foreign vessels for trading, but their supply was interrupted by the Huang Chao Rebellion (黄巢起义) (877-880 AD). Muslim merchants were massacred in Guangzhou following an attack by Huang Chao's armies. No Chinese historical evidence records this event but it can be found within Arabic accounts (Twitchett and Fairbank 2007:736-740, Lewis 2009:161). According to one Arabic writer, 'In 877 AD, Huang Chao killed one hundred and twenty thousand people including Muslims, Christians, Jews and Zoroastrians who had sought refuge in the city (Guangzhou)' (Abu-Zayd 1733). This led to a decline in the maritime activities of Arab merchants in the late Tang period and subsequently ships from the Islamic world began to meet the Chinese halfway on the Malay Peninsula (Park 2012:70).

In the middle of the 10th century (945 AD) the weakening of the power of the Abbasid Caliphate is manifest through the conquest of Baghdad by the Buyid dynasty. Shortly afterwards a well-documented earthquake in 977 AD badly destroyed Siraf (Chaudhuri 1985:49) and had a negative impact on the importance of the city, such that from the 11th century AD onwards, its position in the Indian Ocean became significantly reduced (Whitehouse 1975). Although it is been believed that the town was already declining by this time, it can be seen that there was a gradual decline as Siraf was still involved into the long-distance trade from China to the Gulf, till to the 13th century. This is mainly based on archaeological excavations that have revealed that Chinese ceramics, such as Longquan celadon date to the later period of the 14th century (Figure 3.1) (Kennet et al. 2011). Although the quantity of these Far East goods had decreased, this demonstrates that Siraf continued to be involved in Indian Ocean trade (Rougeulle 1991:94, 1996:169). It also can be seen that the great trading city of Sohar, in Oman, also declined during the period of about the 10th century (Williamson 1974).

Behind this gradual decline at Siraf was the change in traders from the unique power of the Abbasid Caliphate to many powers from Oman, Aden and the Fatimids in Egypt (Chaudhuri 1985:49, Rougeulle 1996:167-171). During the period from the late 10th century to the 15th century, the political and religious traditions and Indian Ocean trade routes changed due to the decline of the Abbasid Caliphate and the rise of the Fatimid Caliphate in Egypt (Chaudhuri 1985:58).

Clear movement of the trade centres in the Gulf can be seen from the archaeological evidence, with the cities of Kish, Minab and Julfar located closer to the entrance to the Gulf playing a more important role and replacing Siraf during the 11th to the 14th centuries (Morgan 1991, Sasaki and Sasaki 1992, Kennet 2002, Pirazzoli-t'Serstevens 2003, Priestman 2005). The movement of the Hormuz Kingdom from Minab to Hormuz Island in 1300 AD allowed the city to reach its peak in the 14th to 15th centuries (Wiesner 1979), and this economic boom is detailed in historical descriptions (Kauz and Ptak 2001:34-39, Lin and Zhang 2015).

Figure 3.1: Longquan celadon sherds unearthed from excavations in Siraf.
(Provided and photographed by Seth Priestman)

In the Red Sea, the historical Cairo Geniza documents support the notion that the newly founded Fatimid Egypt participated in Indian Ocean trade together with archaeological evidence of large amounts of Chinese ceramics unearthed at Fustat dating from around the 11th to 12th centuries (Rougeulle 1996:170, Yuba 2014). During the 13th to 14th centuries there was further development in the areas around the Red Sea and Yemen (Rougeulle 1996:171-173), which played the role of a middleman for China, India, the Gulf, east Africa and the Mediterranean (Rougeulle 1996:167, Zhao 2006).

The decline of the role of Siraf and the Gulf in Indian Ocean trade occurred over a long period of time, from the late Tang period to the 11th century, and was due to a complicated historical background rather than a solo event, such as the Huang Chao Rebellion in China or the earthquake in Siraf. These single events could not solely cause such a significant change in the trade between China and western Asia, although the political and economic changes in the Abbasid Caliphate played a greater role in changes to maritime trade across the Indian Ocean. In fact, the Huang Chao Rebellion resulted in the formation of a new networked trade which relied on segmented trade routes which replaced the old form of a single sea passage trade from the Persian Gulf to China (Park 2012:70-71).

(3) Trade routes from the Mongol Empire (13th to 14th centuries)

The Mongol conquests of Asia and Eastern Europe in the 13th and 14th centuries were a watershed in Asian and world history. The connection of commercial and cross-cultural interactions around the Indian Ocean and in the Mediterranean region resulted in the formation of complex political, religious and mercantile networks (Morgan 1990:5, Sen 2006:299).

During the age of the expansion of the Mongol Empire, significant political transformations occurred in western Asia. Mongol troops conquered the Abbasid Caliphate in Baghdad in 1258 AD (Boyle 1968:340). In India, Islamic power had entered the subcontinent by the early 13th century. The Qutb al-Din Aybek had took over the throne from the Muhmud of Ghazna and founded the Delhi Sultanate in

1206 AD (Jackson 2003). Muhammad Bakhtiyar invaded eastern India and founded the Bengal Sultanate (Hussain 2003). In the early 14th century, Islamic forces penetrated the Deccan region and southern India and established the Bahmani Sultante in 1347 AD (Wink 1990:Chapter 4).

Islamic merchants have a long tradition of maritime trade in the Indian Ocean, connecting with India and the Far East since at least the 8th to 9th centuries, and they settled down in India in around the 11th to13th centuries. However, the Mongol invasion had partly interrupted Islamic trade. The Mongol commercial network grew across the Eurasian lands, with the contribution of Jewish, non-Muslim Indian and Southeast Asian merchants (Abu-Lughod 1989:300, Sen 2006).

It can therefore be seen that the expansion of the Mongol Empire played an important role in maritime trade in the Indian Ocean, as well as re-connecting the land-based route from China to the West which had been disrupted for over a hundred years during the Chinese Song periods due to the unstable diplomatic relationships between Song China, Liao, Jurchen and Mongol (Franke and Twitchett 1994, Kuhn 2009).

It has been suggested that trade between Southern China and northern alien nations, especially during the Southern Song Chinese period, was limited (Qi 1987:1014-1030, Qin 2000b:33). However, with re-connection under the Mongol Empire, travel, trade and other communications could be smoothly dispatched between China and Mesopotamia. A Yuan Chinese geographer, Zhu Siben (朱思本) (1989d:666) stated that:

> *The West Sea is too far away but ambassadors and merchants could reach there occasionally.* (西海虽远在数万里外，而驿使、贾胡时或至焉)

The West Sea in Chinese historical records may refer to areas from Sumatra in the 10th to 12th centuries, to Hormuz and the Gulf in the 13th to 15th centuries. This understanding and terminology of the geographical concept of the west was expanded from the Song to Yuan dynasties and may be due to the unification of most parts of the Islamic-Asia area by the Mongol Empire (Liu 2011:12-14).

With these smooth routes established between the West and East, many travellers and ambassadors could now move around and trade. Famous travellers, such as Marco Polo, Yang Tingbi, Wang Dayuan and Ibn Battuta, have been very well discussed and described in historical studies (Ibn Battuta 1929, Polo 1938, Wang 1981, Chaudhuri 1985, Abu-Lughod 1989, Sen 2006:301-312, Park 2012). Pope Clement V also sent a group of missionaries, via India, to Yuan China in 1307 AD, which was well recorded in both historical and archaeological evidence (Moule 1914:540, Zhang 1977:266-267, Lin 2013:271-278). In 1338 AD a group of Yuan Imperial ambassadors was sent to visit Pope Benedict XII and their visit also included a meeting with Louis the Great of Hungary and gifts included Jingdezhen fired Qingbai porcelain and the so-called 'Fonthill Vase' (Figure 3.2) (Finlay 2010:156-157).

Figure 3.2: The Fonthill Vase and a drawing of it by Barthelemy Remy in 1713 AD.
(Collection of the National Museum of Ireland)

Although the land routes had been re-connected, in comparison with previous periods, after a few decades the Silk Road was again disrupted by the Chagatai Khanate during the 13th to 14th centuries (Liu 1985:104, Bai 1997:581-582). This suggests that the sea route and trade via the Indian Ocean from Mongol China to the West still played an important role and represented a more peaceful option than the land route.

(4) Short summary: outlined changing patterns of western Indian Ocean trade in the 8th to the 14th centuries

The Gulf witnessed its trade heyday from the East to the West under the Abbasid Caliphate during the 8th to 11th centuries. The importance of Siraf, a key trading port in the Gulf, has been demonstrated historically and archaeologically. Following the decline of Siraf, trading power in the western Indian Ocean was shared by the Gulf, Yemen, Red Sea and Egypt. Following the unification of a large part of Eurasia by the Mongol Empire, new trade routes appeared from the east to the Indian Ocean and the Silk Road was reconnected.

3.2.3 Chinese trade expansions and the voyages of Zheng He

Ancient China gives the impression of disdaining commerce, due to the influence of Confucian virtue and noblesse oblige, and literal interpretation of Chinese official histories (cf. Huang 1969:74, Abu-Lughod 1989:Chapters 9 and 10). However, it is not hard to find historical records to suggest that Chinese emperors were highly concerned by commercial benefits. For example, Emperor Gaozong (宋高宗) of the Southern Song (1127-1167 AD) stressed that trade income 'can reduce his people's labour force' (庶几可以少宽民力尔) (Xu 1957:Volume 44-20). Similarly Confucianist sayings also argue the importance of wealth. For instance, according to Confucian attitudes, 'wealth is only in the form of the success of an endeavor that can be fairly guaranteed by virtue and morality' (子曰："富而可求也，虽执鞭之士，吾

亦为之”) (Weber 1964:159-160).

In terms of Chinese attitudes to maritime trade, it can be seen that the overseas trade activities of China might have kept growing gradually through free private trades and a relatively positive attitude from both Confucianism and the Chinese government since the early 11th century. It has been suggested that overseas trade had not been much interfered with by Confucian attitudes until about the pre-14th century, because before that time Chinese maritime trade had not reached a point that its development would have challenged the accepted view of Confucian ideology (Wang 1970:233). However, this interpretation does not clearly describe the Chinese official attitudes to maritime trade, or answer the question of why there was a relatively positive attitude from Confucianism and the Chinese courts (Abu-Lughod 1989:341, 350). But both historically and archaeologically, it can be seen that the Chinese interests in maritime trade had been growing only after the 12th century (Lo 1955, 2012, Deng 1999:86, Heng 2005, Park 2012). Although it has been seen that traded goods from China, such as silk, had reached south-east Asia as early as the 2nd Century AD (Guy 1986:1-2), and at the same time, Chinese goods had been traded to Iran or even further to the Roman Empire via the Silk Road (Liu 1988:19, Stauffer 1996:19, Schmidt-Colinet et al. 2000:55-58), there was no historical or archaeological evidence to support the large scale participation of Chinese merchants in this trade.

At least, however, it can be confirmed that Song Chinese central courts supported maritime trade (Lo 2012: Chapter 2) but the furthest point reached by Chinese merchants was only near Malacca (cf. Heng 2005). In terms of trading to the western Indian Ocean, it seems that engagement in maritime trade by Chinese merchants did not begin on a large scale until the 14th to 15th centuries (Deng 1997:85-86, Zhang 2013).

The economic effects of Chinese merchants in the Indian Ocean are poorly understood through both historical and archaeological evidence. Few historical mentions or fragments of archaeological evidence relating to the western Indian

Ocean trade exist, which illustrate the changing role of Chinese merchants. From the low interest in maritime trade during the later Tang period to the monopolised trade voyages in the early Ming period, Chinese merchants/official trade activities demonstrate totally different attitudes. This section aims to provide an outline description of this gradual change based on the available historical and archaeological evidence.

(1) Low interest in seafaring of Tang China

Lo argues that (2012:57-58), although China had over 1700 years of maritime experience up to the 11th century, it cannot be regarded as a true naval power. The navy, in both terms of military and commerce, had been considered as the secondary arm for the China's political administration before the 12th century. Hourani (1995:75-76) has suggested that no Chinese merchant ships traded between China and the Gulf during the 8th and 9th centuries, although in *The Accounts of China and India*, it was recorded that 'Chinese Ships (al-Sufun al-Ṣīnīyah)' were trading in the Gulf (Abu Zayd 1733). However, the description of the structure of these 'Chinese ships' actually better fits the characteristics of dhows, the indigenous boats that come from Arabia, Persia and India and which sailed the Indian Ocean, rather than Chinese ships (Park 2012:65). In terms of geographical knowledge, although the mapping of Indian Ocean trade and travel routes was initially performed by a Tang Chinese minister and geographer, Jia Dan (贾耽 730-805 AD), he collected information based on the descriptions of Arab merchants without actually visiting any foreign countries (Li 1996:118, Park 2012:31).

Chinese travellers, monks and officials all visited India and the Near East via sea-routes during the Tang period. For example, the Tang Chinese monk, I-Ching (义净), visited India via an Arab merchant ship in 671 AD, and his first stop was in Palembang in Sumatra (Wang 1988:8). During a return voyage from *Heiyi Dashi (黑衣大食, Abbasid Caliphate)* to Guangzhou, a Chinese general, Du Huan (杜环), a prisoner from the Battle of Talas, travelled back to China by merchant ship in 762 AD (Li 1996:120, Park 2012:29). However, no clear description can support the ownership of this ship as either Chinese or Arabic, due to the loss of Du Huan's writings.

Limited archaeological evidence partly supports this point through the Belitung shipwreck, which is the earliest archaeological find of a trade ship in the Indian Ocean and dates to the 9th century (Flecker 2001, Guy 2005, Krahl et al. 2010) (Figure 3.3). This wreck has been confirmed as belonging to Arab merchants (Omani, Yemeni or Iranian) (Flecker 2001:345-348, 353, Krahl et al. 2010:118), and was probably built in Arabia or in India, but it was full of Chinese cargo. Once again there was nothing on the ship to indicate that Tang Chinese merchants participated in Indian Ocean trade. The lack of early Chinese shipwreck archaeological evidence perhaps supports the absence of Chinese traders at this time. Based on a comprehensive shipwreck dataset collected by Roxanna M. Brown (2009:161-181), it can be seen that the Belitung shipwreck is the only archaeological evidence of Indian Ocean trading before the 10th century.

Figure 3.3: Changsha bowls (left) and lead ingots stored in a Dusun jar (right) from the Belitung shipwreck.
Source: (Krahl et al. 2010:104, 109)

The only evidence to support an official Chinese visit to the Gulf is a stone stele unearthed in front of the Yang Liangyao's tomb in Jingchuan County in Shaanxi

Province. The inscription of this stele clearly describes the official visit of Yang Liangyao (杨良瑶), as a Tang Chinese ambassador to the Abbasid Caliphate (Rong 2012, Schottenhammer 2014).

The lack of more archaeological evidence suggests that Tang Chinese merchants did not reach the commercial emporia of the Malabar coast and neither was there a middle point for trade and exchanges in the Indian Ocean between Tang China and the Abbasid Caliphate. This may be due to the scarcity of contemporary sources that could provide information on this question, but the expansion of Islamic trading in the Indian Ocean had been quite well established by this time (Chaudhuri 1985:50-51). In contrast, Tang China was more interested in tributary trade from foreign counties to China rather than in participating in maritime trade (cf. Li 1996, Deng 1997).

(2) Maritime trade expansion of China from the 11th to the 14th centuries

In the Tang period, although Chinese merchants were not encouraged to participate in maritime trade, a policy of welcoming foreign merchants had existed since 714 AD, and was marked by the appointment of *Shi Bo Shi* (*市舶使*), an official who dealt with foreign trade. The establishment of this government post indicates the preliminary establishment of the so-called *Shi Bo* (Foreign Trade) policies and administrations (*市舶制度*) for the following dynasties (Ning 1997:116-118).

This newly-established foreign trade system of the Tang court obviously had a less-reliable administration to deal with the importing trades. The local governors of Guangdong and Lingnan Circuit (approximately current Guangdong and Guangxi provinces) were often corrupt. Demanding, bribes and levying heavy taxation upon foreign merchants. It had been mentioned that 'for these over 40 foreign merchant ships [in 772 AD], there was not even an exception of exactions from them (夷舶至者四十余，末见不暴征之效)' (Lv 2005:909). It also has been recorded that: '[in 758 AD] Persian [merchants] attacked Guangzhou, robbing warehouses and residential blocks (波斯与大食同寇广州，劫仓库庐舍)' (Liu 1975:Vol. 198). It has been suggested that this attack was probably caused by the anger of foreign merchants towards on the unfair and corrupted foreign trade administration (Lv 2005:910).

But the *Shi Bo* system of Tang China was still important and by following it, the Min Regime (893-945 AD) in Fujian and the Nanhan Regime (905-971 AD) in Guangdong actively participated in foreign trade (Deng 1999:86). Then the Northern Song court recognised the importance of export trading revenues and tribute missions began to arrive at the Song court as early as 960 AD, the first year of the Song dynasty (Heng 2005:172). The Song court continued the maritime trade administration of the late Tang period, and in order to manage sea trade activities, the *Shi Bo Si (市舶司 Office of the Superintendent of Merchant Shipping)* was established in 971 AD in Guangzhou port, quickly followed by Hangzhou and Mingzhou ports. These offices allowed the regulation of trade relations between Song China and other countries in southeast Asia and the Near East (Heng 2005:171, Park 2012:43-44).

In the 11th century, the Song court's attitude towards maritime trade changed and it increasingly encouraged the participation of Chinese traders outside of the official tribute mission framework (Heng 2005:173). Private Chinese traders were accorded official recognition and were allowed to engage in maritime shipping trade in overseas areas. However, this maritime trade was mostly confined to Southeast Asia and not the Near East.

After the Huang Chao Rebellion and the attack on Guangzhou port in the 9th century in which Islamic merchants who had settled in Guangzhou had fled or been killed, the tribute mission advisory ceased and direct trade between China and the Near East declined. It was recorded that in 1023 AD the Song government advised Arab envoys to stop dispatching tribute missions to China and instead to use the sea route to Southeast Asia rather than the maritime trade route to the Near East (Ma 1936:339), as this route had become an unsafe trade passage. Islamic merchants had to meet Chinese merchants or obtain Chinese exported goods in Southeast Asia (Heng 2005:175) and it is likely that during the 11th century, the Song court began to control most of the trade and shipping in the eastern half of the Indian Ocean

(Chaudhuri 1985:51, Park 2012:54).

Throughout the 11th to 12th centuries, Song China faced a military threat from the northern nomadic nations; the Liao (Khitan) and Jin (Jurchen). After losing the capital, Kaifeng City, and the northern Chinese territory in 1127 AD, the Song court moved to Lin'an City and founded the Southern Song state, which they could defend against further attacks by Jin armies using the natural barrier of the Long River. The collapse of the Song Court in 1127 AD marked the end of the Northern Song period and for the remainder of the Song dynasty court officials in Lin'an referred to it as the 'temporary capital'. This indicates many orthodox Song officials and scholars considered Lin'an to be an unacceptable capital city as it was noisy, crowded and possessed a narrow city plan, therefore an unsuitable city for their Emperor. However, located at the end of the Long River, Lin'an had a geographical and strategic advantage of the natural barriers of waterways, lakes, rice fields and hills, which could stop attacks by the Jin armies. The Song court continued to hope that eventually the dynasty would be able to re-take northern China and return to the Kaifeng Capital (Kuhn 2009:64-71, 205). As a result of the loss of northern China, the territory north of the Huai River, the Song government revenue and agricultural supplements were partly cut off or lost completely.

Many historical records note that Chinese shipping trade, especially for high value and luxury items, such as jewellery and aromatics, had been prohibited because the central authority wanted to impose financial austerity in order to deal with the dire economic stresses after the loss of northern China (Ma 1936:Vol. 20, Xu 1957:Vol. 44). However, this austerity did not last very long because the Southern Song court had to rely on the external economy and revenues from maritime trading which was actually flourishing at this time (Heng 2005:187-188).

After a short prohibition in maritime trade from around 1127 to 1133 AD, the offices of *Shi Bo Si* were re-established in Zhejiang, Fujian and Guangzhou (Ma 1936:Vol. 62, Xu 1957:Vol. 44). Maritime trade became increasingly important for the Song court and from 1130 to 1160 AD the administrative changes concerning foreign trade showed that it held a high economic position, as the state actively encouraged maritime trade, and the administration of maritime trade and foreign policies was restructured. This enabled foreign traders to be welcomed and allowed to trade annually with Chinese ports (Heng 2005:188).

During the Yuan dynasty in the 14th century there was further development of both land and sea based routes. Moreover, the encouragement of maritime trade was also further developed based on the trade policy of the Song period. A new policy to support commercial sailors to trade was initiated and under this scheme, the Yuan government provided merchants with ships, financial support and sailors in order to trade overseas, with profits shared between the government and merchants via a 7:3 ratio (Deng 1999:86). Ibn Battuta described voyages from Calicut and other Malabar ports to China in the 14th century as being sailed only by Chinese junks (Hourani 1995:83).

In general, during the 11th to 14th centuries Arab merchants seem to have lost their pre-eminence in trade of the eastern Indian Ocean but their commercial orientation was highly important to both the Song Chinese and Yuan Mongolian courts. Maritime trade was developing steadily throughout this period, although there was a very short ban in trading activities in China.

(3) The voyages of Zheng He

From early Ming times, during the late 14th to the early 15th centuries, Chinese foreign trade, such as pepper, sapanwood and other luxuries, was an Imperial monopoly, closely guarded to ensure that all the profits went to the Ming court (T'ien 1981:188). In terms of the official maritime trade, Emperor Yongle (永乐) (1360-1424 AD) sponsored maritime expeditions led by Zheng He (郑和) with the aim of projecting Ming Chinese power as far afield as Java, Sri Lanka and the East African coast (Dreyer and STEARNS 2005, Chao 2012). This was a new and significant period of increased Indian Ocean trade, when the two far ends of Asia, the Hormuz Kingdom and Ming China, linked together and reached new limits of discovering each other in terms of culture, commerce and communication. This time can be viewed as a return to the trade between China and Islam, comparable to trade during the 8th to 9th centuries. The Ming Chinese maritime general, Zheng He, voyaged with his fleets to the western Indian Ocean, and Chinese maritime power, to some extent, reached its highest point.

Near the entrance to the Gulf, the Kingdom of Hormuz (Old Hormuz) was strategically located in what is today known as the Minab plain of Iran. During the 13th and 14th centuries, the two cities of Kish and Hormuz were political and economic rivals, with the ruler Mahmud Qalhatï of Hormuz, finally winning the contest. Around the same time, at the beginning of the 14th century, the Hormuz Kingdom moved from Old Hormuz to Jarun Island, and established its autonomy (Aubin 1953:102, Morgan 1991:71-78, Piacentini 1992:171-173, Kennet 2002:161) which was known as New Hormuz (Kauz and Ptak 2001:17-22). By the early 15th century, an economic boom had extended the new Hormuz kingdom to the Julfar area, situated on the southern coast of the Hormuz Strait (Williamson 1973:57, Kennet 2002, 2003, 2004).

New Hormuz experienced an economic boom in the 14th to 15th centuries, according to both historical and archaeological research, and Hormuz Island was considered a world-trading centre as mentioned by the 15th century historian al-Samarkandi:

> *'Hormuz is a port without equal on the face of the earth. The merchants of Egypt, Syria, the lands of Rum, of Azerbaijan, Khorasan, of the Ma wara'al-Nahr and Turkestan direct their paths to this port. The inhabitants of maritime countries arrive from China, Java, Tanasserim, from Bengal, Malabar, Zanzibar, Abyssinia, Aden, Jeddah…. With the goods they bring they may buy anything they wish. People of all religions, and even idolaters, meet in this city, and nobody permits any hostile gesture or injustice against them.' (Thackston 2001:69)*

While the Persian Gulf entered an economic boom, at the eastern end of Asia the Mongolian rule of the Yuan dynasty (1274-1368 AD) was over and Ming China had started to play a new role in Indian Ocean trade. Unofficial trade was illegal during most periods of Ming China, and since Ming China had a large and strong domestic market it appears that continuous foreign trading was not essential (Kerr 2002:125). Furthermore, costal security of the natural border of Ming China was a high priority for the first Ming Emperor, Hong Wu (洪武) (Chao 2012:29-36).

In the early 15th century Emperor Yongle had attempted to monopolise tributes and foreign trade through Zheng He's expeditions (1371–1435 AD), which marked a significant point in Chinese and world history (Kerr 2002:125, Park 2012:169). Contact between Ming China and the Persian Gulf, which had thrived since the earliest years of the Ming Dynasty, was enormously enhanced through the seven voyages of Zheng He, the fleet admiral of the Ming Empire and a Muslim from Yunnan, whose Arab ancestors had migrated to China during the Yuan Dynasty. Zheng He's voyages involved several hundreds of large vessels sailing from China, and on four occasions they travelled as far as the Persian Gulf and East Africa. Zheng He's expeditions consisted of 27,400 men and 62 fleets of the treasure ships supported by 190 smaller ships (Kauz and Ptak 2001, Dreyer and STEARNS 2005:122-124, Park 2012).

Between 1413 and 1433 AD (Chao Zhongchen 2012: 101), four of Zheng He's voyages to Hormuz Island were apparently involved in the economic boom in the Gulf (Kauz and Ptak 2001:27), and luxuries, such as ceramics, silk, gold, silver, jewellery, and gemstones, were traded between the Hormuz Kingdom and Ming China. Zheng He's visits to, and trade with, Hormuz are clearly recorded in an Islamic account of the history of Tarikh-i Ja'far (Kauz and Ptak 2001:55), which describes the trades as follows:

'During his (Saif ad-Din's) reign, many ships (jank) from China (Chïn), with Chinese products and many silken fabrics, came [to Hormuz] on several occasions. He (again Saif ad-Din) sold countless [normal] pearls and royal pearls to them, and he received many riches in return – gold, silver, silks and ceramics – filling the treasuries [with them].'

Chinese historical accounts, recorded in the books of Xi Yang Fan Guo Zhi (西洋番国志), Ying Ya Sheng Lan (瀛涯胜览), and Xing Cha Sheng Lan (星槎胜览), describe Zheng He's first visit to the Gulf as around 1413 AD. Separately, in 1417 and 1433 AD, the Hormuz Kingdom paid tributes and treasures to Ming China, including pearls, gemstones, and animals, such as lions, leopard, war horses, and giraffes (Chao 2012:112-119).

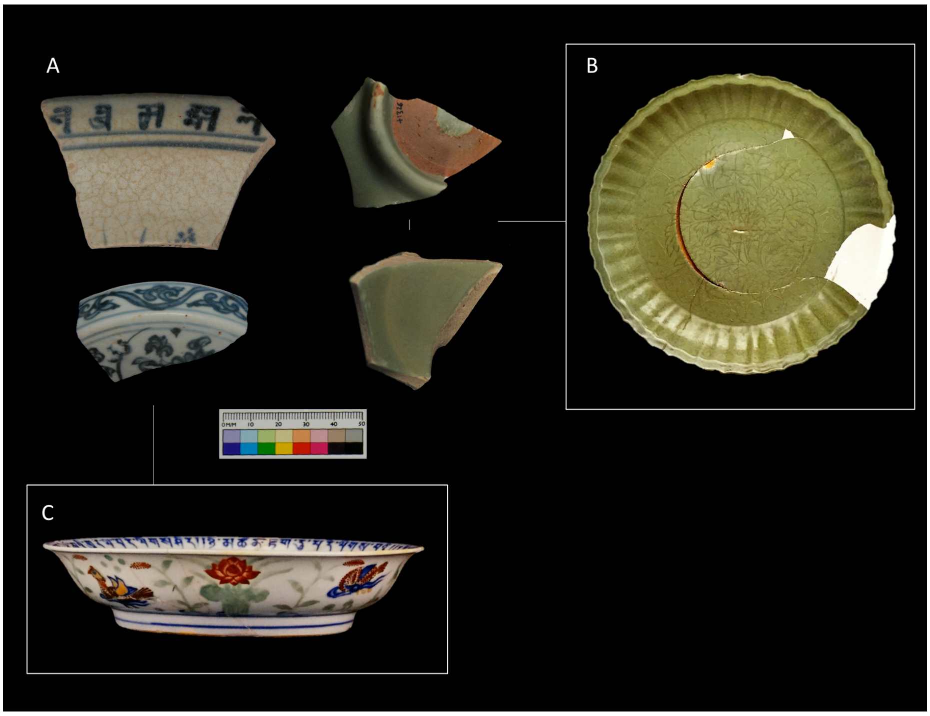


Figure 3.4: Early Ming Chinese ceramic sherds found on Hormuz Island.

(A) Sherds unearthed from Hormuz Island, housed in the Williamson Collection; (B) An Imperial Celadon plate manufactured at the Longquan kiln sites (Diameter: 62.4cm); & (C) An Imperial blue and white porcelain plate with overglaze painting decorations unearthed manufactured at the Jingdezhen Imperial Kiln site (Height: 4.6cm).

Based on archaeological survey missions by Andrew Williamson and Ulrich Wiesner (Wiesner 1979, Priestman and Kennet 2002, Priestman 2005), the early Ming Chinese ceramic sherds found on Hormuz Island may have been both illegally traded and exchanged through Zheng He's voyages (Lin and Zhang 2015) (Figure 3.4). The recent finding of imperial type Longquan sherds, can confirm to some extent, that Zheng He visited present-day Hormuz Island, and early Ming blue and white porcelain sherds found on Hormuz Island may also demonstrate this (Wiesner

1979, Lin and Zhang 2015). The more similar and rarer findings from Julfar indicate that Zheng He visited the Hormuz Kingdom, because Julfar was under its control from approximately 1330 to 1507 AD (Pirazzoli-t'Serstevens 2003:4). Based on the archaeological findings from both Hormuz Island and China, Zheng He was involved in the economic boom, which occurred during the 15th century AD. Excavations at Fustat in Egypt and Gedi in Kenya have also unearthed Chinese ceramics, including early Ming blue and white porcelain and Imperial-type Longquan celadon (Liu et al. 2012, Qin and Liu 2012:19-20, Clunas and Harrison-Hall 2014, Yuba 2014:280-281), which may further reveal that the power of early Ming China in the Indian Ocean had expanded.

(4) Short summary: changing of the attitude of China towards maritime trade

During the period from 8th to the 15th centuries the attitude of the Chinese government towards maritime trade changed, from no participation to encouragement and later the monopolisation of overseas trade. A highly considered and welcoming foreign trade policy had a significant impact on Indian Ocean trade with the Near East.

The establishment of *Shi Bo Si Offices* in the late 10th century marked the beginning of the Chinese government efforts to systematically manage foreign trade from overseas. Chinese merchants were encouraged to sail the Indian Ocean from the 11th century onwards and the evidence has revealed the important role played by China in maritime trading. Chinese government maritime trade expanded and Chinese merchants voyaged across the Indian Ocean, reaching a peak during the Yuan dynasty. Due to coastal border security early Ming China banned private maritime trade in the late 14th century, but this policy has quickly reversed with the voyages into the Indian Ocean by Zheng He who was sent by Emperor Yongle. These voyages are considered to be the largest monopolisation of power by China in the Indian Ocean trade.

3.2.4 The entry of Europeans and the re-opening of China

In the middle of 15th century the sudden decline of Ming Chinese maritime power in the Indian Ocean provided an opportunity for both Arab and European merchants. This was seven decades after the return of Zheng He's final voyage in 1433 AD, and there were less Chinese goods travelling across the Indian Ocean in comparison with earlier periods. In almost the last year of the 15th century, Portuguese explorers arrived in East Africa and travelled to India. An ironic historical event is that Arab sailors had given this 'chance left by Chinese' to the Europeans by guiding them into the Indian Ocean, and the European merchants 'captured' India, Malacca and Macau. The official re-opening of Ming China for trade was very difficult but finally occurred in the late 16th century. However, since the 16th century neither Chinese nor Arabs have been able to halt the expansion of European merchants in Indian Ocean trading.

(1) The sudden decline of Ming Chinese maritime power

In 1424 AD the death of Ming Emperor Yongle, the powerful supporter of Zheng He's voyages, had a strong negative impact on Chinese official trade to the Gulf. Just one year after succeeding to the throne, the son of Emperor Yongle, Emperor Hongxi (洪熙) (1378-1425 AD) halted and banned Zheng He's voyages following suggestions of his officials (Anonymous 1962:Renzong Shilu Vol. 1, Part 1). However, in 1430 AD the son of Emperor Hongxia, Emperor Xuande (宣德) (1399-1435) sent Zheng He to visit Hormuz once again, and this seventh and final voyage to the Gulf and Indian Ocean was the last of the Ming official's expeditions (Zhang Tingyu 1974:Vol. 340).

The attitude of Emperor Xuande towards foreign trade was unclear and relatively neutral, and he quoted an account from an ancient Chinese historical classic chronicle, *the Spring and Autumn Annals (春秋)*, and expressed his thoughts on foreign trade such that China should 'welcome those who come and do not chase after those who leave' (来者不拒，去者不追) (Anonymous 1962:Xuanzong Vol. 38).

In 1433 AD, Zheng He's fleets had returned to China and this marked the beginning of the decline of Chinese maritime and trade power in the Indian Ocean (Chao 2012:131-140). Due to financial restraints and political criticism, later Ming emperors were determined to close China's seacoasts to foreign visitors (Chaudhuri 1985:61-62). Although a foreign maritime trade banning regulation was issued by the Ming government, small scale private smuggling trades often occurred along the trade route from Fujian to South East Asia. However, it appears that no large scale and long distance trading to as far away as the Gulf was made again by Chinese junks (Chao 2012:140-146).

With the shortage of Chinese goods supplying trade in the Indian Ocean due to the closed Chinese seacoasts in the 15th century, archaeological evidence suggests a 'Ming Gap', which describes the absence of Chinese ceramics in sites dating to this period; instead ceramics from south east Asia are present (Harrisson 1958, Brown 2009).

(2) The arrival of Europeans

As mentioned previously, following the decline of Ming Chinese official maritime trade and the Chinese sea ban around 1435 AD, trade between China and the Indian Ocean decreased. Trading activities in the western Indian Ocean had been shared with local authorities from the Gulf, Yemen, the Red Sea and Egypt during the 11th to 14th centuries. By the end of the 15th century, the Arab merchants clearly retained the leading positions in Indian Ocean trading, although they were less familiar with Indonesia than with India (Hourani 1995:83).

The decline of trade routes from China and the leading position of Arab merchants were interrupted by the entry of the Portuguese into the Indian Ocean very early in the 16th century. After approximately seven decades since the visits of Zheng He and without competition from Chinese fleets, the Europeans became strong foreign powers and recognised the importance of the trade in the Indian Ocean. In 1498 AD with the help of Arab and Indian sailors, Vasco da Gama voyaged from eastern Africa to Calicut. Subsequently the Arabs could neither drive out nor compete with the Portuguese or the other European nations which followed them as they navigated the Indian Ocean, and the prosperous Arab merchants and their trading underwent a slow decline (Hourani 1995:83-84).

In 1511 AD the expansion of Portuguese maritime power in the Indian Ocean had resulted in Afonso de Albuquerque capturing the trade routes from Goa to Malacca. Based on well controlled Malacca, European explorers, such as Jorge Álvares, Rafael Perestrello and Tomé Pires, made many attempts to open Ming China to trade (Twitchett and Mote 1998:333-336, Chao 2012:149). However, during the reign of the Emperors Zhengde and Jiajing (1506-1566 AD) Ming China tried to reject the Europeans and fought sea battles in the coastal provinces of Guangdong and Fujian (Chao 2012:149-154). Nonetheless, Portuguese relations with China became normalised in the 1540s (Figure 3.5), and an official permit from the Ming court allowed the Portuguese to establish a permanent base at Macau in 1557 AD (Twitchett and Mote 1998:340). Behind the conflicts between the Ming Chinese court and the Portuguese explorers, Chinese private smuggling frequently occurred in Guangdong Province, where the local powerful merchants were regarded as pirates by Emperor Jiajing, and a similar situation also occurred in Fujian (Chao 2012:187-205).

Figure 3.5: Blue and white bowl with armillary spheres and the Portuguese arms, encircled inside with a Portuguese inscription.

(Height: 115mm, dated to 1541 AD) (Krahl 1986b:449)

In 1566 AD the death of Emperor Jiajing marked the end of the Ming Chinese sea ban. In the following year, as suggested by the Fujian provincial governor (grand coordinator), Tu Zeming (涂泽民), Emperor Longqing revoked the ban on coastal foreign trade (excluding Japan) (Chen Zilong 1962:Vol. 400). However, this re-opening of China was very limited as the only port opened was Yuegang port (月港) near Zhangzhou, and only merchants from Zhangzhou and Quanzhou in the southern province of Fujian were allowed to trade (Chao 2012:217-221). Although this open policy was continued by later Ming emperors, short-term closures of Yuegang port also occurred (Chao 2012:220-221).

Regardless of the limitations of the re-opening of Ming China during the reign of Emperor Longqing, the long-term sea trade ban was essentially reversed. However, Ming China was highly concerned about Japanese *wocou* (倭寇), the pirate threat to coastal security and therefore limited trade with Japan. In reality no Asian power, such as India, the Near East or China, considered the Portuguese to be a strong competitor (Chaudhuri 1985:79).

(3) Short summary: the entering of European merchants

Figure 3.6: The Imperial Gifts sent by the Qing Emperor Qianlong to the British Ambassador Sir George McCartney

Housed in the Royal Collection (Height: 605mm and 104mm, dated to 1793 AD).
Source: (The Royal Collection of the UK)

As the end point of this historical background, the re-connection between China and Indian Ocean trade made by Portuguese ships marks a new start in the globalisation process and maritime trade. European nations arrived in steam or oil powered ships in the Indian Ocean via the Suez Canal, whilst Arab merchants and sailors were still exploring the routes from Quwayt and Aden to India, without sufficient navigational knowledge to guide them to venture far from the coast (Hourani 1995:84). The Qing Chinese government attempted to limit the number of foreign traders in Guangzhou port and offered gifts (Figure 3.6) during the mercantile visits of the British diplomat Sir George McCartney (1737-1806 AD) (Zhang and Yang 2014). Since this time neither Chinese nor Arabs have ever recovered their leading commercial position which they achieved during the medieval period.

3.3 Methodological review: key studies and their problems

Following the historical review in the last section, it can be seen that Chinese ceramic trade in the Indian Ocean has a long history that covers over a thousand years. Based on this long period of time, many researchers have attempted to understand the development of Chinese trade ceramics. Their work has been presented in separate studies of Chinese ceramic history or as case studies from the Indian Ocean archaeology.

For example, Quan Kuishan and Meng Yuanzhao presented an individual chapter for introducing Chinese trade ceramics in their book *Ancient Ceramics* (2008:Chapter 9). Their work is a summarised introduction to past key studies and finds concerning the historical changes in Chinese ceramics exported to the Indian Ocean and Europe. Otherwise, a recently published *Chinese Ceramic History* (中国陶瓷史), written by Fang Lili, presents a short historical review of Chinese ceramic exports and trades, as separate chapters. These introductions are based on archaeological findings and anthropological perspectives to discuss the cultural and economic exchanges of early globalisation between China and the world (Fang 2013: Chapters 7.6, 7.7, 8.6, 9.7, 10.6 and 11.1). However, without a systematic description of the trade ceramics, these brief works are not able to present clearly the changes in ceramic classes and the detailed trends in trade.

In terms of case studies, Ye Wencheng has noted many separate themes within traded Chinese ceramics, especially from the Fujian and Guangdong local kilns and their wares exported via the Indian Ocean. His works have been collected in the book *of the Selected Papers of Ancient Chinese Exported Ceramics* (1988). However, Ye Wencheng does not join his studies together to present a comprehensive and overall pattern to determine the archaeological and historical changes in Chinese ceramic trade.

Table 3.1: List of Recent Selected Key Studies on Chinese Trade ceramics.

Topics	**Author & Year**
Archaeological Studies of Chinese Ceramic Trade in the Indian Ocean	Bing Zhao (2006)
	Pirazzolit' Setevens (2003)
	Qin Dashu (2008, 2013)
	Regina Krahl (2010)
	Lin Meicun (2015)
General Study of Chinese Ceramic Trade	Lin Meicun (2010)
	Bing Zhao (2013)
	Wang Guangyao (2011)
	Rose Kerr (2002)
Traded Ceramic Industries in China	Ho Chuimei (2001)
	Li Jian'an (2010)
	Qin Dashu (2010)

Many articles have been recently published, such as those by Rose Kerr (2002), Qin Dashu (Qin and Gu 2007, Qin 2008, 2013, Liu et al. 2012), Wang Guangyao (2011a), Lin Meicun (Lin 2010, Lin and Zhang 2015), Li Jian'an (2010b), Regina Krahl (Krahl et al. 2010), Bing Zhao (2006, 2013), Pirazzolit' Sertevens (2003), Ho Chuimei (Ho 2001) and so forth (Table 3.1), which separately achieve a new understanding of trade ceramics with regards to individual ceramic classes and historical perspectives, each with obvious merits. However, none provides a comprehensive comparative understanding over an extended period of time.

There are also many articles and books written on Indian Ocean archaeology. Their understanding is from a different angle and views the historical and archaeological trade trends with/without ceramic classifications. Four key works will now be introduced and used to demonstrate the issues and questions faced when comprehensively studying the ceramic trade in the Indian Ocean.

3.3.1 Mikami Tsugio and the Ceramic Road

Mikami Tsugio, a Japanese scholar, constructed a huge research plan of archaeological work and surveys around the Indian Ocean. He travelled from the Philippines to India, from the Persian Gulf to Africa, and from Iraq to Egypt, all areas where a myriad of Chinese ceramic sherds had been found. Mikami noted that in the Middle Ages a sea route linked trade and cultural communications between the East and West. Following this route numerous ceramic findings are the physical proof that demonstrates that trade and communications existed, and he named this route '*the Ceramic Road*', a route as significant as the Silk Road (Mikami 1969). Ceramics were of course not the only goods transported via the Ceramic Road as other commodities, such as spices, tea, silk and so forth, were still common in the maritime trade even into the late 18th century (Goddio et al. 1999:125-126). Mikami argues that the development of overseas trade had a crucial effect, in particular on the distribution of heavy and fragile Chinese ceramics. He believes that the beginning of the Ceramic Road represents the land trade route that originally passed through Central Asia that had been shifted on to the Indian Ocean (Mikami 1969:246-252).

As perhaps the earliest scholar to attempt to study Chinese ceramic trade in the Indian Ocean systematically and comprehensively, Mikami contributed the most to highlighting the direction of trade routes between China and the western Indian Ocean. However, the issue with his work that his understanding was mainly based on archaeological surface surveys and collected ceramic finds. At the time he was working published information on ceramic finds was very limited. His study was based on a qualitative approach to re-building the trade history between China and the Indian Ocean. There were no systematic archaeological observations to allow a unified classification of Chinese ceramic findings in his ceramic collections and this prevented him from discerning many of the finer details of chronology and regional patterning that exist in the material.

3.3.2 Axelle Rougeulle and trade patterns in the western Indian Ocean

A milestone in the understanding of the Chinese ceramic trade in the western Indian Ocean was achieved by Axelle Rougeulle (1996). Mainly based on the archaeological evidence unearthed in the western Indian Ocean during the second half of the 20th century, she explored change in western Indian Ocean ceramic trade during the 8th to 14th centuries. Using very limited quantitative datasets that she collected herself, an archaeological outline of these trade patterns was presented in which she argued that private merchants from the Persian Gulf extended their trading networks to the Red Sea, East Africa and China. However, during the following two centuries trade routes changed from the Gulf to the Red Sea following the rise of the Qays, Hormuz and Egypt. In the 13th to the 14th centuries, the rise of Hormuz played an important role in the Indian Ocean, while the Red Sea network expanded to East Africa (Rougeulle 1996).

This excellent study by Rougeulle resulted in a good understanding of the western Indian Ocean trade as an overall pattern. But, as she noted, quantitative studies on the Indian Ocean trade were difficult without a precise and standardised classification of ceramics and more accurate archaeological datasets (Rougeulle 1996:176), despite her collecting and listing the most important archaeological missions and collections in the Gulf, Red Sea and East Africa. Moreover, in her work she placed less emphasis on understanding the Indian, Mongolian and Chinese historical background/archaeological evidence. This is a weakness, as these Asian powers were obviously very important in Indian Ocean trading. Most important though, is that each of the published reports that Rougeulle used classified the ceramics in a slightly different way making comparisons between sites and regions difficult.

3.3.3 Mark Horton, Derek Kennet and their quantified studies

Ceramic finds from Shanga and Ras al-Khaimah have provided an ideal opportunity for studying the development of trade in the western Indian Ocean as they are strongly relevant to the Oman Peninsula, Eastern Arabia, coastal Southern

Iran and East Africa. These studies are based on well quantified assemblages from Kush, al-Mataf and Shanga along with well stratified information, and a more or less unified classification system using a system of ceramic ‘classes’ which includes Islamic, Chinese and other ceramics (Horton et al. 1996, Kennet 2004). In Kennet’s work a total of 106 classes are described, with nearly 30 classes of Chinese ceramics being distinguished and defined with the help of Regina Krahl (Kennet 2004:60-70). Although many sites were covered in Kennet’s study, his classification system was intended to be used as a method for identifying and dating ceramic finds from across a large area of the western Indian Ocean in a standardised and comparable way that would allow direct quantified comparisons to be made between sites and between different regions.

Mark Horton provided one of the earliest attempts at a quantified analysis based on the archaeological finds from Shanga (Horton et al. 1996). This profoundly influenced the understanding of western Indian trade patterns, in East Africa. The contribution of Kennet’s work is obviously important as it provides a classification system for a wider area which was used to understand the development of Indian Ocean trade using quantitative studies.

However, in terms of Chinese ceramic classes, neither of these studies created a systematic, comprehensive and well-defined classification based on a solid knowledge of Chinese ceramic history and archaeology. Although a large number of kilns with low-quality trade ceramics have been unearthed and excavated in China, a lack of published studies which are accessible to an English-speaking academic audience means that the results of this work has not yet been fully incorporated into the study of trade ceramics in the western Indian Ocean.

3.3.4 Andrew Williamson and archaeological surveys of the Gulf

Using simple equipment and working on his own, Andrew George Williamson undertook one of the most extensive and ambitious modern archaeological surveys in the Gulf. Chinese ceramic material in the Williamson collection was assembled during this programme of excavations and surface surveys of approximately 900 archaeological sites in southern and south-eastern Iran between September 1968 and April 1971 (Priestman 2005:1). The collection includes over 19,000 ceramic sherds, around 3,500 of which were imports from the Far East (Priestman and Kennet 2002, Kennet et al. 2011:447-449). The untimely death of Williamson in 1975 when he was working in Oman prevented his research from being completed. Further work on the massive scope and potential of Williamson's research was continued by Seth Priestman in 2005.

Priestman has classified of all the ceramic material and built a database recording all material information, which enables further analysis on the themes of the sites and distribution of the ceramics in the Williamson Collections Project possible (Priestman 2005:134). His work is starting point for understanding the long-term regional patterns of development in the Gulf. In terms of Chinese ceramic classes, Priestman has mainly followed Kennet's methodology and classification with further improvements and a more detailed classification by Regina Krahl. However, similar to Kennet, despite the value of this work, Priestman has failed to present the steady development of Chinese ceramic finds from the Gulf based on Chinese ceramic archaeology and the definition and dating of the classes that he presents is often not clear enough and is not closely enough linked to the published Chinese dating evidence. Too often the datings and classifications are 'impressionistic' and are based on the opinions of a single expert or scholar (in this case Krahl) using terms and class names that are not standardised, meaning that it is impossible to challenge or revise the findings.

3.4 Questions raised in this chapter and data collection

Although it is important to see the obvious contributions from case studies or in-depth studies of individual sites in the western Indian Ocean and the unearthed sherds of Chinese ceramics (e. g. Morgan 1991, Pirazzoli-t'Serstevens 2003, Liu et al.

2012, Lin and Zhang 2015), there is an increasing and obvious need to establish the general pattern of Chinese ceramic trade in the western Indian Ocean over an extended period of time. According to previous reviews of Chinese trade ceramics, a theoretical development of the understanding of the larger pattern of trade ceramics can be deduced, from surface-surveys and historical-record based studies, such as those by Mikami and Williamson (Mikami 1969, Williamson 1973), and the quantified-sequence and classification based studies, such as those by Kennet and Priestman (Kennet 2004, Priestman 2005).

As mentioned previously, Rougeulle noted the importance of larger patterns using quantified datasets; however, she was unable to develop this line of investigation much further as her database was limited and she lacked detailed and accurate information for each site. In contrast, Kennet and Priestman began to establish a better-defined, standardised and more accurate database of ceramic finds in the Gulf based on Kush materials and the Williamson Collection, although their datasets did not cover the wider area of the overall pattern of the western Indian Ocean. In addition, in terms of Chinese ceramics their understanding of Chinese ceramic history and archaeology is quite limited and their ability to link their findings to the latest published evidence from China is really non-existent.

3.4.1 Questions raised in this chapter

Based on these previous studies, it can be seen that there are still significant barriers to a comprehensive and large-scale review of the development of Chinese trade ceramics in the western Indian Ocean. Due to varying systems of classification and terminologies the published list of Chinese ceramics cannot yet be unified into a dataset that will allow summary statistical analysis to be done. It is therefore important now to determine a strategy for future studies: which is more comprehensive, more detailed and which is more closely linked to published evidence from China itself. The aim is to provide a more detailed and systematic dataset on Chinese ceramic finds from the western Indian Ocean.

However, before a broader study can go ahead, a unified classification system is needed as a chronological and geographical framework. Although all scholars working in the region have their own systems, there is clearly a good deal of variation between the views of one expert and the next. No one has yet attempted to create and publish such a classification (see Chapter 4) and it is increasingly clear that a lack of such a classification is a major impediment to further progress. This chapter therefore aims to take the first steps towards addressing this problem, initially by collecting a dataset in order to determine precisely what classes of Chinese ceramics were traded in the Indian Ocean.

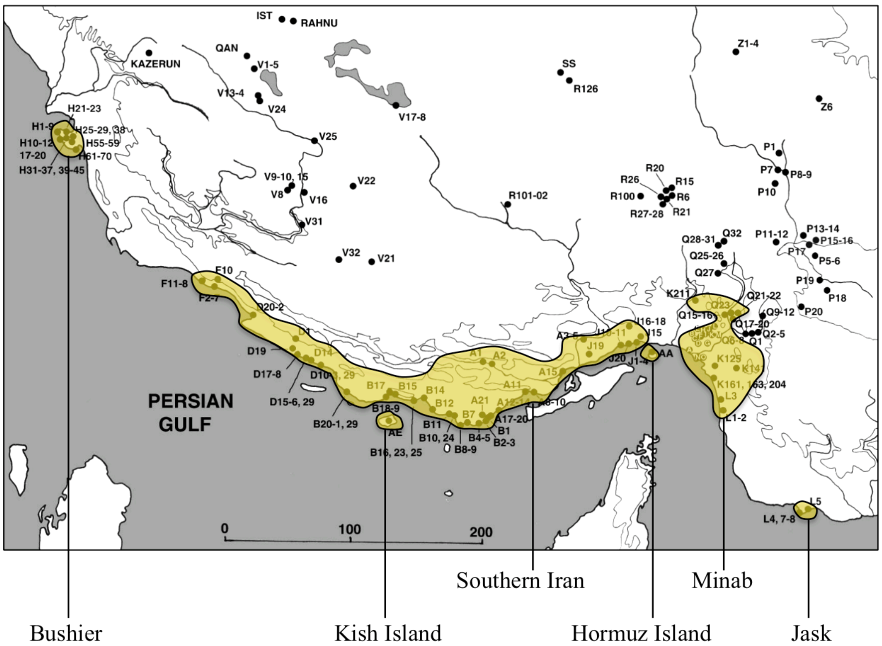
This aim of this chapter to undertake the preparation for creating a unified classification system linked to the understanding of the Chinese ceramic industrial history presented in Chapter 2.

3.4.2 Data collection

The dataset used in this chapter comes for the most part from a re-examination of surveyed/excavated archaeological material from the western Indian Ocean coasts, most of which have been previously published (see references listed in Appendix 3). In addition, some excavated materials are included that were inspected by the author, such as Sanjan (Nanji 2011) and Pattanam in India, Mantai materials from Sri Lanka, the Siraf and Williamson collections from Iran, and other materials kindly provided by other archaeologists, such as Laurence Smith (University of Cambridge), the Suakin collection from Sudan (Mallinson et al. 2009), Lefrancq Coline (Universite Libre de Bruxelles) and the Mahasthangarh collection (see detailed information of these collections in Dataset 3: sites 1, 34, 35, 39, 54 and 103). The core of the dataset comes from the Williamson Collection Project.

The Far Eastern pottery in the Williamson Collection was collected from 215 sites from coastal Iran and includes about 3,500 sherds. These sites have been divided into six areas within this dataset, based on Priestman's study (Priestman and Kennet 2002, Priestman 2005:134-145). Shown on Map 3.1, these six areas are: Hormuz Island

(AA: sherds numbered with ‘AA’, the site code in the Williamson Collection), Minab area (K), Kish Island (AE), Southern Iran (A, B, D, F and J), Bushier (H) and Jask area (L8) (Priestman 2005) (see detailed information of these collections in Dataset 3: sites 52, 53, 55, 65, 123 and 124). The Southern Iran area includes some surface surveyed Chinese ceramic sherds from Siraf but these are different to the Siraf excavation by David Whitehouse (Whitehouse 1968, 1969, 1970, 1971, 1972b, 1974).



Map 3.1: Sketch map of the sites in the Williamson Collection
Source: (Priestman 2005:46)

In total, including the sites that were inspected by author, this chapter assembles data from 129 archaeological sites in the western Indian Ocean (Table 3.2). Over 30,000 Chinese trade ceramic sherds can be classified into 577 groups in 13 different classes (Table 3.4 and Dataset 3). In order to show the information from these sites clearly, it has been summarised in the form of tables and listed in Dataset 3 in Appendix 3. Table 3.3 shows an example of some sites (Mahasthangarh in Bangladesh, Tughlaq Palace and Kilakkarai in India) which are listed in Dataset 3. As is shown, there are two parts to the data presentation: the upper part provides information such as ‘Site Type’ (inland site or coastal site), ‘Location’ (city locations of these sites), ‘Published Photos’ (photos of Chinese ceramic finds), ‘Excavation/Survey’ (the type of archaeological research), ‘Site Dating’ (reported dating periods of these sites) and ‘References’. The lower part, which is entitled ‘Unearthed Chinese Ceramics’ shows the unearthed Chinese ceramic finds, which includes the ‘Class’ (reported ceramic classes by ceramic appearances), ‘Kiln Site’ (possible producers of this ceramic assemblage), ‘Quantity’ (how many sherds in the assemblage), ‘Quality’ (ceramic fabrics: e.g. pottery, stoneware or porcelain) and ‘Ceramic Dating’ (possible dating periods of this ceramic assemblage). In this information, the definitions of ‘class’ are based on the information given in the published archaeological reports.

3.4.3 Exploratory statistical analysis (presented in Tables 6.7 to 6.11)

Based on the suggested dating information of these Chinese ceramic assemblages from Dataset 3 and the historical review of Chinese ceramic industries (Chapter 2), all these collected Chinese trade ceramic sherds can be divided to follow five periods (the Period 6 is excluded, due to the research scope of this thesis).

Period 1 = the 8^{th} to 10^{th} centuries (approx. Tang and Five Dynasties period)
Period 2 = the 11^{th} to 13^{th} centuries (approx. Song dynasty)
Period 3 = the 14^{th} century (approx. Yuan period)
Period 4 = the 15^{th} century (approx. the early Ming dynasty)
Period 5 = the 16^{th} to 17^{th} centuries (approx. the late Ming dynasty)
Period 6 (excluded) = the 17^{th} century and after (approx. Qing dynasty)

It should be noted that these five periods have to follow the chronology of the development of Chinese ceramic industries. For example, as discussed in Chapter 2, Chinese ceramic finds dated to about the middle and late Tang period (the 8^{th} to 9^{th} centuries and in many cases including the 10^{th} century) cannot be further grouped to the 8^{th} or the 9^{th} century. Similarly, in Period 2 (11^{th} to 13^{th} centuries) some low quality trade ceramics produced in Guangdong and Fujian cannot be accurately dated to Northern Song (960-1127 AD) or Southern Song (1127-1274 AD) periods, or to the 11^{th}, 12^{th} or 13^{th} centuries.

Table 3.2: List of Sites within Dataset 3 *(see their locations in Map 1.2 and detailed information and references in Appendix 3)***.**

Site 1: Mahasthangarh, Bangladesh	Site 27: Kulasekarapattinam, India	Site 53: Hormuz, Iran	Site 79: Sohar, Oman	Site 105: Mnarani, Kenya
Site 2: Tughlaq, India	Site 28: Kunnattur, India	Site 54: Siraf, Iran	Site 80: Rustaq, Oman	Site 106: Kinuni, Kenya
Site 3: Kilakkarai, India	Site 29: Pondicherry, India	Site 55: Bushier, Iran	Site 81: Wadi Maqaqah, Oman	Site 107: Kilepwa, Kenya
Site 4: Periyapattinam, India	Site 30: Velur, India	Site 56: A'ali, Bahrain	Site 82: Aqaba, Jordan	Site 108: Kilwa, Tanzania
Site 5: Palaya-Kayal, India	Site 31: Golkonda, India	Site 57: Bahrain Survey, Bahrain	Site 83: Athar, Saudi Arab	Site 109: Mombasa, Kenya
Site 6: Arikamedu, India	Site 32: Sadras, India	Site 58: al-Huwailah, Qatar	Site 84: al-Sharjah, Saudi Arab	Site 110: Shanga, Kenya
Site 7: Gangaikondacholapuram, India	Site 33: Anjengo, India	Site 59: Yusufiyah, Qatar	Site 85: Sirrin, Saudi Arab	Site 111: Gedi, Kenya
Site 8: Darasuram, India	Site 34: Sanjan, India	Site 60: al-Furaihah (II), Qatar	Site 86: al-Mabiyat, Saudi Arab	Site 112: Manda, Kenya
Site 9: Settur, India	Site 35: Pattanam, India	Site 61: al-Zubarah, Qatar	Site 87: Najran, Saudi Arab	Site 113: Unguja Ukuu, Tanzania
Site 10: Vellore Fort	Site 36: Old Goa, India	Site 62: al-Na'man, Qatar	Site 88: Bar Antar, Saudi Arab	Site 114: Jongowe, Tanzania
Site 11: Kannur, India	Site 37: Vadodara, India	Site 63: Bir Zekrit, Qatar	Site 89: al-Jar, Saudi Arab	Site 115: Mkokotoni, Tanzania
Site 12: Dharmadam, India	Site 38: Manikapatana, India	Site 64: Ras Uwainat Ali Dis, Qatar	Site 90: Aynunah, Saudi Arab	Site 116: Zanzibar town, Tanzania
Site 13: Mahe, India	Site 39: Mantai, Sri Lanka	Site 65: Kush, UAE	Site 91: Abyan, Yemen	Site 117: Fukuchani, Tanzania
Site 14: Quilandi, India	Site 40: Polonnaruwa, Sri Lanka	Site 66: Area 74, UAE	Site 92: Ahwar, Yemen	Site 118: Kizimkazi, Tanzania
Site 15: Ponnani, India	Site 41: Panduwasnuvara, Sri Lanka	Site 67: Khatt, UAE	Site 93: al-Shihr, Yemen	Site 119: Ras Mkumbuu, Tanzania
Site 16: Kodungallur, India	Site 42: Dedigama, Sri Lanka	Site 68: al-Mataf, UAE	Site 94: Sharmah, Yemen	Site 120: Mtambwe Mkuu, Tanzania
Site 17: Pandalayini, India	Site 43: Allaippiddi, Sri Lanka	Site 69: Julfar, UAE	Site 95: al-Qisha, Yemen	Site 121: Nkia wa Ngombe, Tanzania
Site 18: Kollam, India	Site 44: Vankalai, Sri Lanka	Site 70: Hulaylah, UAE	Site 96: al-Qaraw, Yemen	Site 122: Mapungubwe Hill, Southern Africa
Site 19: Tangasseri, India	Site 45: Yapahuwa, Sri Lanka	Site 71: Did Diddah, Oman	Site 97: Kish Island, Iran	Site 123: Southern Iran Coast, Iran
Site 20: Calicut, India	Site 46: Nilaveli, Sri Lanka	Site 72: Mukhi, Oman	Site 98: Habil, Yemen	Site 124: Jask, Iran
Site 21: Machilipatnam, India	Site 47: Galle Harbour, Sri Lanka	Site 73: al-Balid, Oman	Site 99: Kawd am-Saila, Yemen	Site 125: Sofala, Mozambique
Site 22: Motupalli, India	Site 48: Anuradhapura, Sri Lanka	Site 74: Bukha, Oman	Site 100: Zabid, Yemen	Site 126: al-Nudud, UAE
Site 23: Kottapatnam, India	Site 49: Sigiriya, Sri Lanka	Site 75: Sayl al Asfal, Oman	Site 101: Fustat, Egypt	Site 127: Aydhab, Egypt/Sudan
Site 24: Pulicat, India	Site 50: Male, Maldives	Site 76: Ra's Sheikh Mas'ud, Oman	Site 102: Quseir, Egypt	Site 128: Qal'at al-Bahrain, Bahrain
Site 25: Nagapattinam, India	Site 51: Banbhore, Pakistan	Site 77: Ghubbat Dabshun, Oman	Site 103: Suakin, Sudan	Site 129: Bilad al-Qadim, Bahrain
Site 26: Devipattinam, India	Site 52: Minab, Iran	Site 78: Wadi Shariyah, Oman	Site 104: Manekweni, Mozambique	

Table 3.3：An example of three sites listed in Dataset 3 (Appendix 3)

Site 1: Mahasthangarh, Bangladesh					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Inland Site	-	True	Excavation	Pre-History to 18th Centuries	Unpublished: Author's data
Site 1: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Enamelled	JDZ (Jingdezhen)	4	Porcelain	16th Century	17
Blue and White	JDZ	3	Porcelain	16th to 17th Century	
Celadon	LQ (Longquan)	9	Stoneware	13th to 14th Centuries	
White	DH? (Dehua)	1	Porcelain	16th to17th Centuries	
Site 2: Tughlaq Palace, India					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Inland Site	Delhi	True	Excavation	Historical Texts (1354-1398)	(Smart 1977)
Site 2: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Blue and White	JDZ	67	Porcelain	14th Century	72
Celadon	LQ	5	Stoneware		
Site 3: Kilakkarai, India					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site	Tamilnadu	False	?	14th Century	(Subbarayalu 1996)
Site 3: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
?	?	A few	?	14th Century	?

Following this division of Dataset 3, among these 577 assemblages 531 are divided into these six periods (including the period after 17^{th} century) by their ceramic dating provided by these archaeological reports or examined by author. The rest are the undateable group. Excluding the Period 6 (out of the scope of this thesis), each period has the divided data that is sub-divided by site locations. And sherd numbers produced by these sites will be counted.

In order to present the information of each period, Tables 6.7 to 6.11 in Appendix 5 have been made and following the arrangement from Period 1 to Period 5. Each table shows the summary statistics of sherd numbers in terms of different traded ceramic classes (based on ceramic appearance) and producer (possible original manufacturing kiln in China) (see the analyses and disccusions in following sections below). The list of traded Chinese ceramic classes is as follows (Table 3.4, see their definitions in Chapter 4 according the index in Table 4.2):

Table 3.4: The list of traded Chinese ceramic classes.

Ceramic Classes	Names in Dataset 3	Code names in classification
Blue and white ceramics	CBW	Blue and white complex
Brown glazed wares	Transport containers	T/C Jars complex
Celadon wares	Celadon	Celadon complex
Enamelled porcelain wares	Enamelled	Exclude in this classification[7]
Underglazed polychrome wares	Polychrome	CSPW, GDPW
Qingbai wares	QB	Qingbai Complex
Shufu milky white porcelains	SF	JDZSF
White stonewares	White	White Camplex
Sancai polychrome wares	Polychrome	GXPC
Green splashed wares	GS	GXPC
Black wares	Black	JYBW, CZBWW
Copper red porcelains	CR	JDZCWP
Un-identified classes	UI	-

[7] Enamelled porcelain refers to the high-fired white porcelain painted with the red and green enamels that have been low temperature fired again. This class is excluded in Chapter 4 due to the study time scope of this thesis.

3.4.4 Limitations of this dataset collection

In Dataset 3, the problems with some data are very obvious mainly due to missing details in the publications (Zhang 2012, Power 2015). However, approximately 66% of the data is reported in detail, indicating that it has been well recorded. About 20% of the values are poorly reported, for example, in the terms of 'ceramic class', a lot of assemblages are reported as 'unsure', which means that they cannot be well classified, in particular among the white stoneware class or the Qingbai class. Similarly, in terms of 'assemblage quantity', it can be seen that there are many poorly reported numbers. For example, some reports are using the terms, such as 'about 800', 'many', 'less than', 'more than', 'sizeable', 'small quantity', and so forth.

Therefore, the limitation of this exploratory dataset analysis is clear, and without further research to collect more accurate and detailed information of the unearthed ceramics and without further archaeological missions, this method does contain some limitations and potential inaccuracies.

3.5 Exploratory analysis of Dataset 3: Changing of Ceramic Classes.

The following section of this chapter aims to introduce a summary review of the collected information of Chinese ceramic exports in the western Indian Ocean based on Dataset 3 and attempts to set out a preliminary overview of the development of ceramic trade from the 8^{th} to the 17^{th} centuries. It is based on the classification system that is set out in Chapter 4 where detailed definitions and descriptions of each of the classes will be found.

Based on Dataset 3 and Tables 6.7 to 6.11 in Appendices, Table 3.5 and Figure 3.7 provide a general summary of the changing trends of Chinese ceramic findings in the western Indian Ocean from period to period, in terms of 'sherd number', 'site number' and 'class number'.

Table 3.5: General Summary Statistics of Chinese Ceramic Findings in the Western Indian Ocean from the 8^{th} to 17^{th} centuries.

This general summary is based on Dataset 3 and Tables 6.7 to 6.11 in Appendces. This table presents the information (numbers of sherds, site and classr) collected in Dataset 3 from 8th to the 19th centuries. 'Sherd number' shows how many Chinese ceramic sherds have been discovered in each period; 'site number' shows how many archaeological sites with Chinese ceramic materials; and 'class number' shows how many classes have been identified according to the definitions in section 3.4.3. Class number excludes unidentified classes (UI).

Period	8th to 10th	11th to 13th	14th	15th	16th to 17th	17th to 19th
No. of sherds	3,479	2,487	9,552	1,089	4,782	6,528
No.of sites	26	37	81	17	48	34
No.of classes	7	7	8	6	6	6

From Table 3.5 and Figure 3.7-1, it can be seen that there appears to have been a decline in the 11th to 13th centuries in the quantity of sherds. The sherd number reduced from about 3,500 to 2,500. In the 14th century, a great increase in sherd numbers is noted up to over 9,000. The following century, there was again a decline and only about 1,000 sherd were reported. The sherd number did not reach its former level until the 16th century.

Table 3.5 and Figure 3.7-2 show that the numbers of archaeological sites with Chinese ceramic findings follow a very similar pattern to the sherd numbers. The only exception occurred in the period of the 11th to 13th centuries when the number of sites increased from 26 to 37.

Class numbers do not show a clear change from period to period. There were about six to eight classes of Chinese ceramics traded into the western Indian Ocean in each period, but it should be noticed that these classes changed from period to period, although the class numbers in different periods are similar (Table 3.5 and Figure 3.7-3) and the definitions of these classes is somewhat subjective. But still, the 14th century reached a peak of the riches of class diversity of Chinese trade ceramics.

It is therefore reasonable to suggest that, based on a long term and gradual growth which continued for over 10 centuries, the 14th century marks a peak of Chinese ceramic trade to the western Indian Ocean which then declined sharply in the 15th century. Although a big growth of the imports of Chinese trade ceramics can be seen during the 16th to 19th centuries, it seems that they did not reach its 14th century level.

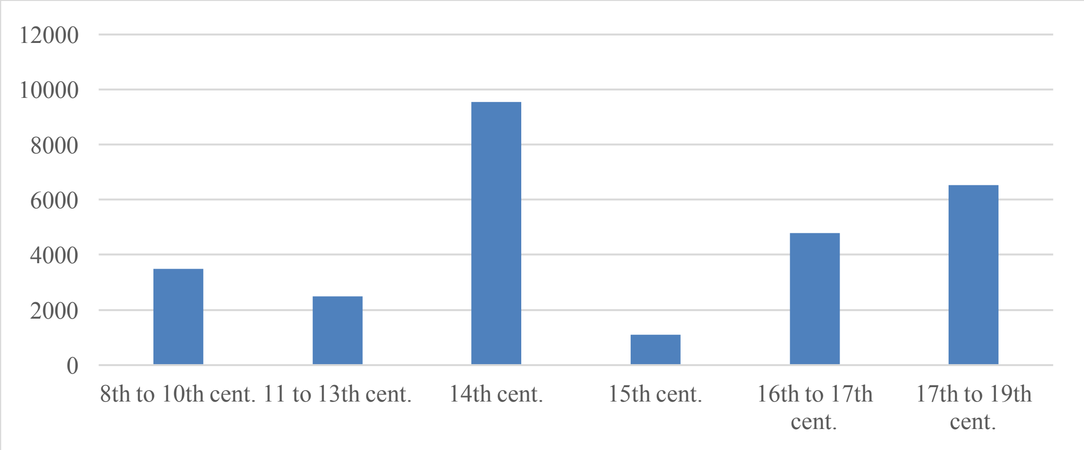


Figure 3.7-1: Changing quantities of sherds

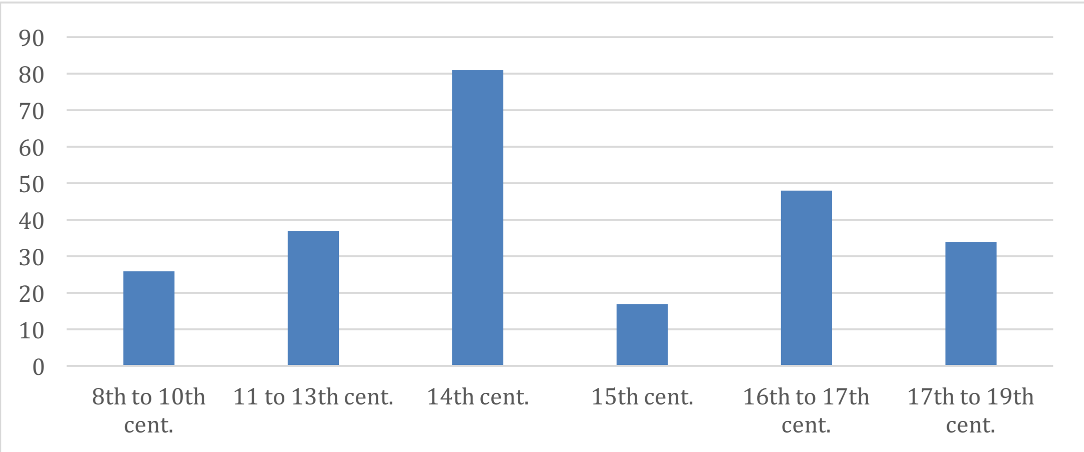


Figure 3.7-2: Changing quantities of sites

Figure 3.7-3: Changing quantities of classs

Figure 3.7: Three figure to show the information of Table 3.5 (changing quantities of sherds, sites and classes).

The table and figures appear to show that according to some criteria Chinese ceramic trade to the western Indian Ocean reached its peak in the 14th century. Following this peak, a very dramatic decline occurred in the 15th century. Of course these trends may have been affected by the fact that archaeologists may have chosen to excavate at 14th century sites more often than at 15th century and later sites, but despite the potential problems with the dataset, this trend cannot be ignored and needs to be considered and explained in future research. In order to further explore the changing patterns of each period in detail, the following section will focus on these periods separately:

3.5.1 The 8th to 10th centuries

As Table 6.7 in Appendix 5 shows Chinese ceramics were already widely distributed in the western Indian Ocean in the 8th to 10th centuries and this might be related to the decline of the traditional Silk Road (Whitehouse and Williamson 1973, Guy 2005, Qin 2013, Zhang 2013, Lin and Zhang in press). There are 26 port cities/sites in the western Indian Ocean that are represented in Dataset 3.

Table 3.6: Percentages of different Chinese ceramic classes dated to the 8th to 10th centuries, reported by the Western Indian Ocean archaeological missions (as percentages of total 3,479 sherds)
(Based on Table 6.7 in Appendix 5)

Class	Percentage	Sherd Counts
Blue and White Pottery	less than 0.1%	1
Sancai Wares	0.1%	5
Green Splashed Wares	2.6%	90
White Stoneware	11.1%	385
Changsha Polychrome Wares	14.9%	524
Celadon Wares	18.7%	650
Dusun Transport wares	52.6%	1,829

As Table 3.6 shows, 3,479 sherds have been reported at these 26 archaeological sites/surveys and seven different classes of Chinese ceramics have been identified, based on summary statistics in Table 6.7 (Appendix 5). Table 3.6 shows these seven classes and the percentage that they make up of the total number of sherds. The amount of blue and white pottery and Sancai wares was very low (only one sherd of blue and white pottery in Siraf had been unambiguously reported among these coastal sites), while there is a higher proportion of green splashed wares although still limited at 2.5%. The classes of celadon, underglazed polychrome wares and white stonewares, each account separately for around 18%, 15% and 11%. The highest proportion of all archaeological finds is Dusun type transport ware at 52.6%. They have been identified as Guangdong local ceramic wares and some of them might come from southern Jiangxi Province (see more discussion in Chapter 4: 4.4.6).

From further examination of these ceramic finds, it can be seen that celadon wares, underglaze polychrome Changsha wares and Dusun type transport wares have all been well identified. It has been reported that the celadon wares mainly consisted of Guangdong celadon and Yue celadon, although understanding of the Guangdong celadon is limited due to the low amounts identified. However, the green splashed wares have a relatively bad identification as in many cases they cannot be easily distinguished from Islamic ceramics (Priestman 2005:248, 307-308).

The most problematic class is the white stonewares. These have been badly identified in publications in many cases. As described in Chapter 2, white stoneware producers were widely distributed across northern China, and it is difficult to attribute sherds to specific kilns these wares, with a limited number being attributed to Gongyi white or Xing white stonewares/porcelain (Pirazzoli-t'Serstevens 1988, Carswell 1996, Carswell et al. 2013). It has also been suggested that Ding white stonewares were traded in this period; however, they cannot be clearly distinguished (Vainker 1991:66-68).

3.5.2 The 11^{th} to 13^{th} centuries

It is interesting to see the development of Chinese ceramics in the following centuries, following the decline of Tang China and the Abbasid Caliphate. As described in Chapter 2, whilst some of the kilns important in the Tang period declined, such as the kilns at Xing and Changsha, the Yue kilns seem to have increased production. These began to play a more important role in the ceramics trade during the late 10^{th} to 11^{th} centuries.

Three eastern Indian Ocean shipwrecks have been identified, the Belitung shipwreck (Flecker 2001), Intan shipwreck (Flecker 2002) and the Cirebon shipwreck (Liebner 2007), and from this very small number a biased picture may result. However, it can be seen that not only did the classes of exported ceramics change, but also the quantity and proportion of exported Yue celadon wares sharply increased (the proportion of exported celadon wares increased from 18.7% in the last period to 47.4%, see Table 3.8).

There must have been strong and stable development at the Yue kilns to support this change, although according to the current archaeological excavations at the Yue kilns there is no evidence of a significant growth in the industrial scale (ZJSKWWKGYJS et al. 2002). However, over 300,000 sherds of Yue celadon were recovered, for example from the Cirebon shipwreck, (Tirtamarta 2007).

Although these three shipwrecks provide some useful hints for understanding Chinese ceramic trade patterns in the western Indian Ocean, there are too few of them to provide an overall and reliable picture. Therefore it is sensible to examine changes in ceramic sherd numbers and classes from the archaeological sites included in Dataset 3 to try to help reveal a clearer picture. Table 6.8 in Appendix 5 shows, 37 sites date to the 11th to 13th centuries in the western Indian Ocean and these have yielded about 2,487 sherds, although nearly 80% of these come from Fustat (Site 101) in Egypt (39.1%) and Sharmah in Yemen (Site 94) (39.8%).

Table 3.7: Ceramic classes reported from shipwrecks.

Source: (Krahl et al. 2010, Flecker 2001, 2002, Tirtamarta 2007, Qin and Gu 2007, Qin 2008, Shen 2008, Munoz 2006, Liebner 2007)

Shipwrecks **Dating** **Location**	**Belitung** **Early 9th cent.** **Belitung Island, Indonesia**	**Intan** **Middle to late 10th cent.** **Java Sea**	**Cirebon** **Late 10th cent.** **Java Sea**
Reported Ceramic Classes	Xing/Ding White, Yue Celadon, Changsha Polychrome, Gongxian GS/White, Guangdong Celadon, Dusun Jars.	Yue/Yue Type Celadon, Ding/Xing/Cizhou white, Jingdezhen Qingbai, Guangdong/Dusun Jars.	White, Qingbai?

Comparison of Table 3.7 and 3.8 shows the different classes of traded Chinese ceramics in comparison with the classes identified in the 9th to 10th centuries. It can be seen that Sancai wares, green splashed wares, blue and white potteries and Changsha polychrome wares had all stopped being exported by this time. Meanwhile new classes, such as Qingbai wares, black wares and Cizhou wares had begun to be exported to the western Indian Ocean. Yue celadon and Ding white stonewares continued to be exported (Table 3.8 and Table 6.8 in Appendix 5).

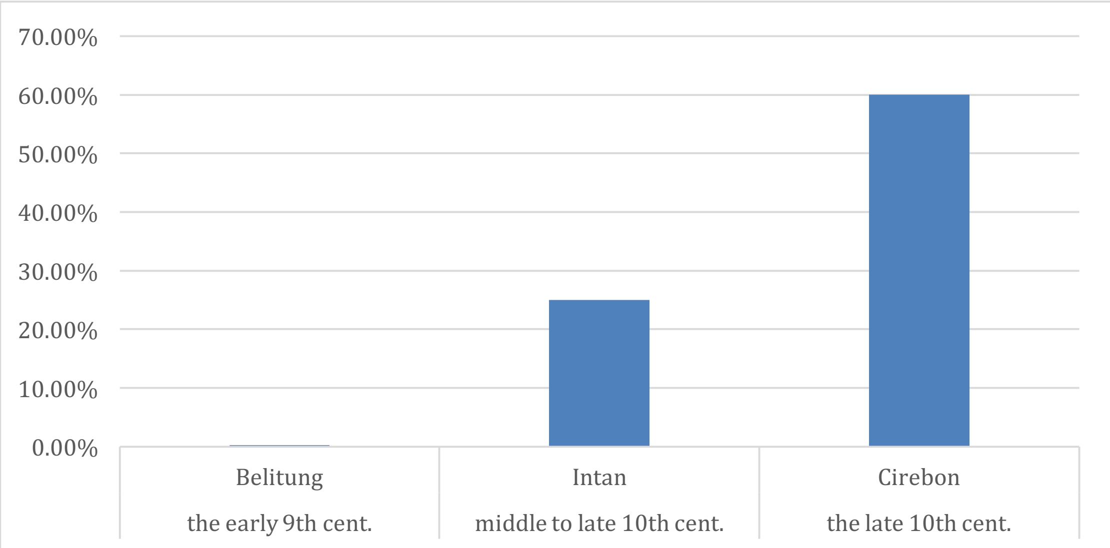


Figure 3.8: Percentage of Yue Celadon from Shipwrecks.

(Belitung= approx. 0.3%, Intan=approx. 25%, Cirebon= approx. 60%)

Source: (Flecker 2001, 2002, Munoz 2006, Tirtamarta 2007, Liebner 2007, Qin and Gu 2007, Qin 2008, Shen 2008, Krahl et al. 2010)

Table 3.8: Percentages of different Chinese ceramic classes dated to the 11th to 13th centuries, reported by the Western Indian Ocean archaeological missions.

(As percentages of total 2,487 sherds) (Based on Table 6.8 in Appendix 5)

Class	Percentage	Sherd Counts
Polychrome Wares	1.6%	40
Black Wares	1.6%	41
Cizhou Wares	0.2%	6
MTB/Dusun Transport wares	0.3%	7
White	10.4%	259
Qingbai	38.3%	953
Celadon	47.4%	1,178
Un-identified	0.1%	3

According to Table 6.8 in Appendix 5, it can be seen that white stonewares constitute most of the Fustat finds. However, it should be noted that classes of Chinese ceramics, especially Xing white stonewares/white stonewares in the 9th to 12th centuries are poorly reported, with uncertain results for ceramic dating, identification and quantification (e.g. Yuba 2014:4). In general, it can be seen that the celadon wares are the most frequent Chinese ceramic finds in the western Indian Ocean, followed by Qingbai wares and white stonewares. This is different to the ceramic class pattern during the previous period (8th to 10th centuries), when white, celadon and polychrome classes were approximately equally represented.

Without information on the manufacturing kilns for these classes the understanding of the transport wares (MTB and Dusun) is very limited, as shown in Table 6.8. This is because the term 'brown glazed jars' refers to a class of transport containers, traditionally classified as either Dusun jars or Martabani jars. These cannot be traced back to their original kilns somewhere in southern China due to the limited understanding of rough quality ceramic wares produced in this region, especially in the provinces of Guangdong and Fujian (see Chapter 4: Transport Jar/Containers).

3.5.3 The Chinese Traded Ceramic Classes in the 14th Century

Some clues concerning Chinese trade ceramics in the late 13th to the 14th century are clearly shown by shipwrecks. The Sinan shipwreck, dated to 1323 AD, was a Chinese merchant ship voyaging to Japan. It was found near southern Korea and a huge number of ceramic finds, metalwork, wooden materials and coins were discovered. Over 20,000 pieces of Chinese ceramics were classified as Longquan celadon (more than 60%), Jizhou and Qilizhen wares and other Qingbai and celadon wares from the Jingdezhen kilns and Guangdong and Fujian local kilns (Kim 2012:21-25). In comparison with previous shipwrecks, this wreck provides a totally different pattern of ceramic classes. At the western end of the Indian Ocean another shipwreck in the Red Sea has also been excavated (Carswell 2000:112, 175-191). Although the understanding of this wreck is limited, it can be seen that some similar classes, such as Longquan celadon and blue and white porcelain, have also been found.

In terms of Chinese ceramic finds from sites in the western Indian Ocean in the 14th century, there are more than double the number of sites (81) in comparison with 37 in the 11th to 13th centuries, and these are shown in Table 6.9 in Appendix 5. And 9, 552 sherds have been reported from these sites and they have been grouped into eight different classes as listed in Table 3.9 and Table 6.9.

Table 3.9: Percentages of different Chinese ceramic classes dated to the 14th century, reported by the Western Indian Ocean archaeological missions.

(As percentages of total 9,552 sherds) (Based on Table 6.9 in Appendix 5)

Class	Percentage	Sherd Counts
Blue Glazed Wares	less than 0.1%	1
Polychrome Wares	less than 0.1%	5
Shufu and Qingbai Wares	2.2%	210
White stonewares	4.6%	438
Blue and White Porcelain	6.8%	645
MTB Transport Wares	11.5%	1,102
Celadon wares	74.7%	7,140
Un-identified	0.1%	11

In the 14th century there is a clear change, as Yue celadon was replaced by Longquan celadon, although both originate from Zhejiang Province. Longquan celadon wares in this period account for more than 74% of all ceramic finds. This is similar to the proportion found in the Sinan shipwreck (Kim 2012:21) and it has been noted that Longquan celadon played a very important role in the Chinese ceramic trade in the Gulf (Morgan 1991:67). Another important new addition is blue and white porcelain manufactured at the Jingdezhen kilns in Jiangxi Province in southern China. Although the blue and white porcelain was only produced in China in the 14th century under the rule of the Yuan dynasty, these goods were traded/sent to the Indian Ocean in a certain quantities (6.8%, see Table 3.9) as famed commodities and diplomatic gifts (SHBWG 2012:41-45, 51-53). In comparison with the previous period, the percentage of white and Qingbai wares had dramatically declined, while Shufu porcelain, red and white porcelain made in Jingdezhen, and Cizhou-sgraffiato ceramic wares have been found in very limited numbers.

Table 6.9 in Appendix 5 also reveals that the identification of Chinese ceramic finds in the 14th century is much better, especially for blue and white porcelain and Longquan celadon wares. However, the reason for this may be that archaeologists may find it confusing when attempting to distinguish Dehua and Qingbai stoneware/porcelain from other white/Qingbai wares manufactured in Fujian or Guangdong Provinces. Moulded wares from Dehua have a feature decoration, which should be well defined and easily identified, although plain white stonewares from Dehua kilns are rather harder to identify (Kennet 2004:63-64).

3.5.4 The 15th Century

In terms of trade from Ming China, there is a simpler pattern in the western Indian Ocean, as the Ming central court attempted to monopolise both private and official trade activities. This occurred just after a short 'sea ban' during the reign of Emperor Hongwu (T'ien 1981). However, in terms of the trade pattern of Chinese ceramics in the western Indian Ocean, it is problematic as the official monopoly and private sea ban resulted in the rarity of archaeological materials, in addition to poor identification of Chinese ceramics from this period. During Zheng He's voyages to the western Indian Ocean (lasting about 20 years from 1413 to 1433 AD) (Chao 2012:101-Figure 2), the common quality Chinese ceramics do not yield clear chronological and typological changes (e.g. see dating results with 'Late Yuan to Early Ming Period' of Chinese ceramic finds, data from Liu et al. 2012:47-49).

Therefore, the well-reported Chinese ceramic materials from the 15th century are mainly based on higher quality and Imperial-type ceramics and come from the areas of Southern Iran, Ras al-Khaimah in the UAE and Hormuz Island in the Gulf (Pirazzoli-t'Serstevens 2003, Priestman 2005, Lin and Zhang 2015), together with Fustat at the top of the Red Sea (Yuba 2014) and the Gedi Ruins in Kenya (Liu et al.

2012). If these sites are excluded, then only a small number of sites have been found with Chinese ceramics dating to this period (Table 3.10 and Table 6.10 in Appendix 5) and it appears that only Jingdezhen blue and white porcelain and Longquan celadon wares were traded. These can be further divided into higher quality ceramics and lower quality ceramics (Qin and Liu 2012:20, Lin and Zhang 2015:422-424) (also see Chapter 4: classes of LQC & JDZBW).

Table 3.10: Percentages of different Chinese ceramic classes dated to the 15th century, reported by the Western Indian Ocean archaeological missions.

(As percentages of 1,089 sherds) (Based on Table 6.10 in Appendix 5)

Class	Percentage	Sherd Counts
MTB Transport Wares	Unknown percentage	Unknown Number
White	0.1%	1
Copper Red Porcelain	0.1%	1
Qingbai Wares	0.4%	4
Blue and White Porcelains	13.8%	150
Celadon	85.7%	933

3.5.5 Trade after 1500 AD

The year 1500 AD is the end point of this thesis, due to the fact that this was when European merchants entered the Indian Ocean, and this has been frequently investigated, with many noting that this marked the change from caravan trading to company trading (Steensgaard 1974, Chaudhuri 1985, Abu-Lughod 1989).

In terms of Chinese ceramic trade, after 1500 AD there is a clear pattern that Chinese ceramics became more widely traded across the western Indian Ocean, although further discussion of the trade routes, merchants or classes of Chinese ceramics will not be provided. However, the pattern of the changes from the 14th to the 15th century is useful, as this demonstrates how after approximately half a century Chinese official expeditions to the western Indian Ocean ceased. Table 3.11 and Table 6.11 in Appendix 5 show the sharp increase in the number of sites in comparison with previous periods and how blue and white porcelain accounts for over 90% of the finds at these sites. Based on Dataset 3, other finds include enamelled porcelain wares, white/Qingbai wares and other ceramics, such as Martabani jars, and Longquan celadon.

Table 3.11: Percentages of different Chinese ceramic classes dated to the 16th to 17th centuries, reported by the Western Indian Ocean archaeological missions.

(As percentages of 4,782 sherds) (Based on Table 6.11 in Appendix 5)

Class	Percentage	Sherd Count
Qingbai Wares	less than 0.1%	1
Celadon	0.1%	6
MTB Transport Wares	1.3%	60
White	0.9%	44
Enamelled Porcelains	2.1%	99
Blue and White Porcelains	95.5%	4565
Un-identified	0.1%	7

3.6 Conclusion of Chapter 3

This role of this chapter was to provide the background and context for Chinese ceramics imported to the western Indian Ocean based on the classification set out in Chapter 4. According to the historical recordings and archaeological findings on the topics of Chinese ceramic trades in the western Indian Ocean, an outlined history has been initially introduced as a background view. It has been shown that in order to provide a reliable description of the trends in ceramic trade, quantitative observations are needed.

The data shows that the sites can be grouped with summary analyses (Tables 6.7 to 6.11 in Appendix 5). Available sherd quantities from these sites have been recorded. Using the dating evidence and archaeological overviews of the development of Chinese ceramic industries (Chapter 2), these Chinese ceramic findings in Dataset 3 have been standardised and grouped. It can be seen that quantitative exploration of these assemblages begins to give a clearer insight into the changing trends of Chinese ceramic classes in the western Indian Ocean from the 8th to 16th centuries. These datings, groupings and analyses of Chines trade ceramics are both based on and applicable to the classification set out in the next chapter, and appear to suggest that the changing trends of Chinese ceramics have divided the Chinese traded ceramic history to the western Indian Ocean to four different periods, during the age from the 6th to 15th centuries.

Period 1 from about the 8th to the 10th centuries. This is the earliest period that Chinese ceramics were traded to the western Indian Ocean on a large scale. They cover most of China but the major part came from the Guangdong province. The majority of Chinese traded ceramic wares are the Dusun glazed wares, which were used for transporting other goods. The celadon wares, white stonewares and polychrome wares were found in equal quantities and it can be seen that northern Chinese ceramics made up a lower proportion, probably due to long transport distance.

Period 2 in about the 11th to 13th centuries. This is the second period of Chinese ceramic trading history, with changes of decreased sherd quantities and increased site numbers in littoral areas in the western Indian Ocean. In this period, the changes of traded ceramic classes are sharp and this can be attributed to the changes in the Chinese ceramic industry as set out in Chapter 2. It can be seen that the export of Changsha polychrome wares, Xing white stoneware/porcelain and Gongxian kiln productions stopped. The rise of Yue celadon wares and newly invented Qingbai stonewares was significant. However, the poor identification and reports of Qingbai wares, in particular of the non-Jingdezhen made Qingbai stonewares, provide difficulties in dating and attributing sherds from this period. Although the ceramic industries in China during to this period changed and the Guangdong based ceramic industry shifted to Fujian province by about the 12th century, this is not supported by paralleled ceramic findings in the western Indian Ocean. This is a very important point and presents us with a question that is worth further study with more and clearer archaeological missions and works in both China and the western Indian Ocean.

Period 3 in about the 14th century. This period shows changes from many perspectives. In terms of both sherd quantities and site numbers, this period represented the peak showing that the Chinese ceramic trades had developed much further. New classes were introduced, such as the Longquan celadon, Jingdezhen blue and white porcelains, and Shufu porcelains. The Qingbai stonewares and Yue celadon wares declined sharply. One point of special note is the growth of Longquan celadon imports which represent nearly 80% of all ceramic findings from over 70 sites in the western Indian Ocean. The Longquan kilns in China at the same time saw a development in terms of industrial scale. This might be part of the reason for this large import of Longquan celadon to the western Indian Ocean in the 14th century.

Period 4 in about the 15th century. This period can be narrowed down to the early 15th century due to the historical event of Zheng He's visit to the Indian Ocean. With this Chinese official voyage and the imperial monopoly on maritime trade, ceramic trading in this period was limited. This can be seen due to the dramatic decline in sherd quantity and site numbers. Another piece of evidence to support this and the 'Chinese Ming official trade' is the discovery of the Imperial type of ceramic wares, such as Longquan celadon and blue and white porcelains. These classes also featured in the traded ceramic class change trend in this period.

It is still unclear how many Chinese ceramic findings there are in the western Indian Ocean, as well as the quantities at sites, site sizes and other types of sites, such as palace sites and inland sites. This is exacerbated by the fact that we are still lacking a standardised and systematic classification. However, it provides an initial overview analysis with the existing and available data from the western Indian Ocean sites and presents a useful picture which confirms and adds significant and comparable detail to the generally held views of Chinese ceramic trade during these periods. When this analysis is improved through the addition of further published materials, the patterns will only become more reliable and clearer.

CHAPTER 4: A CLASSIFICATION OF CHINESE CERAMICS EXPORTED TO THE WESTERN INDIAN OCEAN FROM THE 8TH TO 16TH CENTURIES

4.1 Introduction

As mentioned in the introduction to this thesis, the major objectives of this study are to re-examine Chinese ceramic production in China and their trade in the western Indian Ocean. Based on the overview of Chinese ceramic industries (Chapter 2) and Chinese ceramics traded in the western Indian Ocean (Chapter 3), this chapter presents a proposed, standardised classification of Chinese trade ceramics found in the western Indian Ocean which has been created by revising, joining and further improving already existing frameworks, and which is intended to take a first step towards standardising the terminology and definitions used by those working in the field, particularly those working on fragmentary archaeological assemblages where the full shape and design layout of vessels is not always clear from a small sherd and where classification therefore has to be based on specific and more easily identifiable traits. The need for a holistic classification became apparent from the lack of standardised definitions in the recent literature and the difficulty that this presents when making comparisons between excavated assemblages from different sites, together with a number of issues concerning existing classifications of Chinese ceramic. A concerted attempt has also been made to link the proposed classification to current published Chinese archaeological literature particularly of kiln excavations and tomb assemblages, which provide evidence related to definitions and chronology.

The importance of classification for archaeological studies has been noted in the introduction to this thesis, and it is one of the most important principles in the approaches of archaeology (Childe 1956:12-13, Orton et al. 2010). In addition, the study of ceramics as one of the most important artefacts for understanding archaeological chronology, was described, due to ceramic's ubiquity, durability and abundance (Shepard 1956, Orton et al. 2010).

As the core of this thesis, this chapter aims to introduce a classification for the full-range of ceramic productions traded in the western Indian Ocean area between the 8th and the 16th centuries.

This chapter has three main sections: the first is a review and critical discussion of key existing classifications of Chinese trade ceramics; the next section sets out the structure of the classification; and the final section is a classification, definition, description and discussion of 41 key classes of Chinese ceramics that were imported into the western Indian Ocean region during the period concerned

4.2 Review of key existing classifications of Chinese trade ceramics

To date there is no comprehensive and established classification of Chinese ceramics that were traded to the Indian Ocean although some attempts to describe and analyse Chinese ceramic finds and to develop frameworks have been made. Each of these has obvious merits and has contributed to the understanding of Chinese ceramic imports; however, without exception, they also have various problems, particularly regarding their understanding of Chinese trade ceramics.

The first attempt at a comprehensive classification of trade ceramics, including Chinese ceramics, was by Robert Fox and his team in 1967 following their archaeological missions in Santa Ana and other sites in Luzon in the Philippines. They divided their classification of Chinese ceramics traded to the Philippines into three stages according to the Chinese dynasties: Tang, Song, and Yuan/early Ming (Fox 1967:51-60). Although this classification is not based in the western Indian Ocean, its significance should not be overlooked. The disadvantage of the work by Fox is that his classification does not provide descriptions of the traded Chinese ceramics which allows them to be related reliably to archaeological evidence from China. For example, he used term 'Ying Qing (影青, shadow blue, a Chinese term of Qingbai stoneware)' ware to refer the Dehua moulded wares (the so-called Marco

Polo wares) and linked it to the Dehua kilns (德化窑) and nearby kiln and workshops. He mentioned that it was a kind of common trade ware from China to the Philippines (Fox 1967:55) and his observations were correct, however, due to the lack of Chinese archaeological investigation of the Dehua kilns, Fox's description of the 'Ying Qing' wares was rough, simple and unsystematic.

Another classification was developed by Tampoe in 1989 focusing on Siraf, which is an important site in the Persian Gulf dating to the early Islamic period from the 7th to 16th centuries. Tampoe's work is the first classification of ceramic materials to build a link between the Gulf and China (Tampoe 1989). However, her work is problematic due to inaccuracies and poor organisation (Kennet 2004:32). Tampoe did not attempt an accurate and reliable classification of the Chinese sherds that she encountered and she had no a systematic background knowledge of Chinese ceramic manufacturing and history. Tampoe's classification also fails to provide archaeological evidence to support the proposed dating of Chinese ceramics making it impossible to check or rely upon her information.

A further attempt at a classification of ceramics from China, India and the Near East, mainly unearthed from Kush and Julfar in Ras al-Khaimah, was created by Kennet in 2004. With help from Regina Krahl, Chinese ceramic finds were identified, dated and classified (Kennet 2004:32). Based on Kennet's classification, in 2005 Priestman examined the Williamson collections and with help from Regina Krahl, further developed the classification scheme, adding more detail and classes (Priestman 2005), as well as his recent work of an integrated Indian Ocean Ceramic Classification (including Chinese trade ceramics) (Priestman 2013:642-680). Although these classification systems cover Chinese trade ceramics from about the 9th to 16th centuries the classification has a number of problems and inaccuracies. Examples of these are: 1) identifcation mistakes: some Yue celadon sherds have been wrongly grouped with the Longquan celadon group; 2) failure to identify place of original manufacturer: Dusun and early Dehua Qingbai wares have no information on the original kilns in China, the limited Chinese archaeological evidence is linked to their classification or the chronologies presented; 3) grouping mistakes: some early

Ming Longquan Imperial quality celadon sherds have been classified as late Yuan or early Ming ordinary celadon wares.

Other classifications have been created separately based on individual archaeological sites. The Chinese ceramic classes from Shanga (Horton et al. 1996), Mantai (Carswell et al. 2013), Anuradhapura (Coningham et al. 2006) and Sharmah (Zhao 2006) all have limitations in their understanding of Chinese ceramic archaeology or cannot be linked to other ceramic finds: For example, Carswell's classification does not distinguish clearly between Yue-type celadon wares and Yue celadon wares from Mantai. Furthermore, although Bing Zhao's classification has an excellent understanding of Chinese ceramic materials from Sharmah and is well linked to Chinese archaeology, it cannot be easily applied to other archaeological sites due to the grouping of her classes that focusses only on detailed fabric descriptions and features of the sherds. She does not attempt to fit these into a coherent picture of the development of the Chinese trade ceramics.

In order to illustrate these problems Table 4.1 presents the Chinese ceramic classes of these key classifications and a comparison of the classes. The lower part of this table shows matched or partly matched classifications. As can be seen, based on the descriptions of the classifications, similar classes of Chinese ceramic wares have different names. For example, Yue celadon wares are called 'Yue wares', 'YUEC', 'Yue Stoneware', 'Yue green ware' and 'Yue type celadon'. These names are not standardised but can be linked together by their descriptions. Similarly, 'Dusun transport jars' have been separately called 'DUSUN', 'Dusun Stoneware', 'Olive-green glazed jars', 'Coarse grey stoneware' and 'Jars', and whilst the names cannot be well linked, the same class of Chinese traded wares is being described. However, in the upper part of Table 4.1, it can be seen that many classes cannot be linked. This is due to different classes of Chinese ceramics being discovered at different individual sites, and some classes, which are in reality the same but have been poorly identified due to a lack of a standardised and systematic classification system with clear criteria and definitions.

Table 4.1: Some key classification systems and their classes, matched and unmatched.

Classification Researchers	Tampeo (1989)	Kennet (2004)	Priestman (2013)	Carswell et al. (2013)	Horton (1996)	Coningham et al. (2006)	Zhao (2006)
Sites and Locations	Siraf, Iran	Kush, UAE	Southern Iran	Mantai, Sri Lanka	Shanga, Kenya	Anuradhapura, Sri Lanka	Shirmah, Yemen
Unmatched Classes	Moulded Monochrome Green-Glazed Ware	GRE	WWSL		White porcelain	Xing and Ding white wares	耀州系青瓷 (Yaozhou type celadon)
	Coarse White Wares	SCHINA	WWS				广东、福建青瓷 (Guangdong, Fujian celadon)
	Fine White Wares with Colourless or off-white glaze	CEL	WWF				灰青釉瓷 (Grey celadon)
	Ding-type Southern Ware	GBSTONE	WWJ				釉下彩绘 (Underglaze painted ware)
	Blue and White Ware	WPORC	GDC				酱黑釉瓷 (Brown/Black ware）
	Fine Grey Wares with a colourless glaze	NONCHIN	JDC				绿铅釉瓷 (Green lead glaze ware)
		SWATOW	STO.GRY				素胎瓷 (Unglazed ware)
		KRAAK	STO.BUR				
		POLY	STO.THAI				
		VPOLY	STO.N-ID				
		MOD	IGSJ				
		CHIN	DAB				
			LIB				
			CIZHOU				
Matched/Partly Matched Classes	Yue ware	YUEC		Yue Stoneware	Yue Stoneware	Yue green ware	越窑系青瓷 (Yue type celadon)
	Coarse Grey Stonewares	GGW					
	Fine Grey Wares with a qingbai glaze	DHP DHM	DEH		Moulded whiteware		
	Longquan Celadons	LQC	LQC		Longquan greenware Sage-green glazed greenware Light-brown-glaze greenware		龙泉窑系青瓷 (Longquan type celadon)
		GWW CWW WWG	WWG				
		WHT	WW				
		DUSUN	DUSUN	Dusun Stoneware	Olive-green glazed jars	Coarse grey stoneware	瓷罐 (Jars)
		MTB BSTONE	MTB		Martabani jars		
	Painted Sonteware and Relief Stoneware	CHANG	CHANG	A Changsha Sherd	Changsha painted stoneware	Changsha painted stoneware	
	Cream Stoneware	EASTIN	CREAM				乳白瓷 (cream glazed ware)
		CBW	CBW		Blue-on-white porcelain		
		ENAM	ENAM				
	Splashed Wares		GWSG	Green-Splahsed White Ware			
	Fine White Wares with a qingbai glaze		QING		Qingbai glazed ware		青白瓷 (bluish white ware)

A Longquan celadon classification was created by a Japanese scholar, Kamei, who focused on Longquan celadon finds from Japan dating to the Chinese Song and Yuan periods; it is based on Chinese archaeological evidence (Kamei 1994). His chronological classification of Longquan celadon is reliable due to his wide research and well-collected information. However, this classification is only for Longquan ceramics, which represent only a limited portion of all traded Chinese ceramic wares, and is therefore poorly applicable to a long-term and wide-ranging Chinese ceramic classification for all trade ceramics.

The issues concerning Chinese traded ceramic classification in the western Indian Ocean are clear: (1) there are no easily available standardised descriptions and definitions of the classes; (2) most of them contain no or few references to the Chinese archaeological evidence to support the definitions, identifications and chronology; and (3) names and definitions are not always agreed. The classification system proposed in this thesis will aim to resolve these problems by setting out a comprehensive structure and by linking it to the Chinese literature as closely as possible. Of course it would be foolish to imagine that this system is perfect and that it will be universally agreed, but it is put forwards as a contribution to a classification system that can be used by all archaeologists working in the area.

4.3 Classification structure

Chapter 3 presented an overview of Chinese trade ceramics from western Indian Ocean archaeological sites dating from the 8th to 16th centuries. It can be seen, based on this chapter, that there are six main complexes of different classes of Chinese ceramic materials: (1) celadon; (2) Qingbai wares; (3) white stonewares; (4) blue and white ceramics; (5) polychrome ceramics; and (6) transport and coarse jars (Chapter 3: Table 3.4 and Table 3.9). These classes can be easily and initially grouped based on the appearance of the glaze and ceramic fabric qualities. Chapter 2 provided an introduction to Chinese ceramic history and industries and provides a general background for dating, whilst also introducing the development of Chinese ceramic manufacturing.

Based on these two chapters, this chapter presents a classification structure that follows Chinese ceramic history and industries, and is based on material from the western Indian Ocean. Table 4.2 shows the structure of this classification, arranged based on chronological development. The left side shows the Chinese dynastic periods and the Anno Domini years and the right side indicates the centuries. In total, 41 classes of ceramics have been arranged by their glaze appearance and grouped into six complexes, as noted above. Information on each complex will be introduced separately in Section 4.4.

This system consists of a three-tier classification: the term 'complex' refers to the highest-ranked group of ceramics that share similar glazes; 'class' indicates that ceramics have similar characteristics, and 'sub-class' (such as 'type', 'I-1' or 'I-2') means that a ceramic class can be further divided according to chronological changes based on Chinese ceramic history and industries.

4.4 Classification of the exported Chinese ceramics in the western Indian Ocean

As Table 4.2 shows, there are six complexes and 41 classes of Chinese trade ceramics and this section aims to introduce these complexes and classes individually. An overview of each complex and its development is provided, before introducing each class and providing information on relevant publications, fabrics, origins, definitions, descriptions, dating evidence, drawings and pictures.

4.4.1 Celadon complex

Celadon wares were one of the most popular ceramics produced in China and were exported to the western Indian Ocean especially before the 15th century, being later replaced by blue and white porcelains.

Table 4.2: Structure and Index of Chinese trade ceramic classification.

Table 4.2-1: Development structure of classification of the exported Chinese ceramics in the Western Indian Ocean

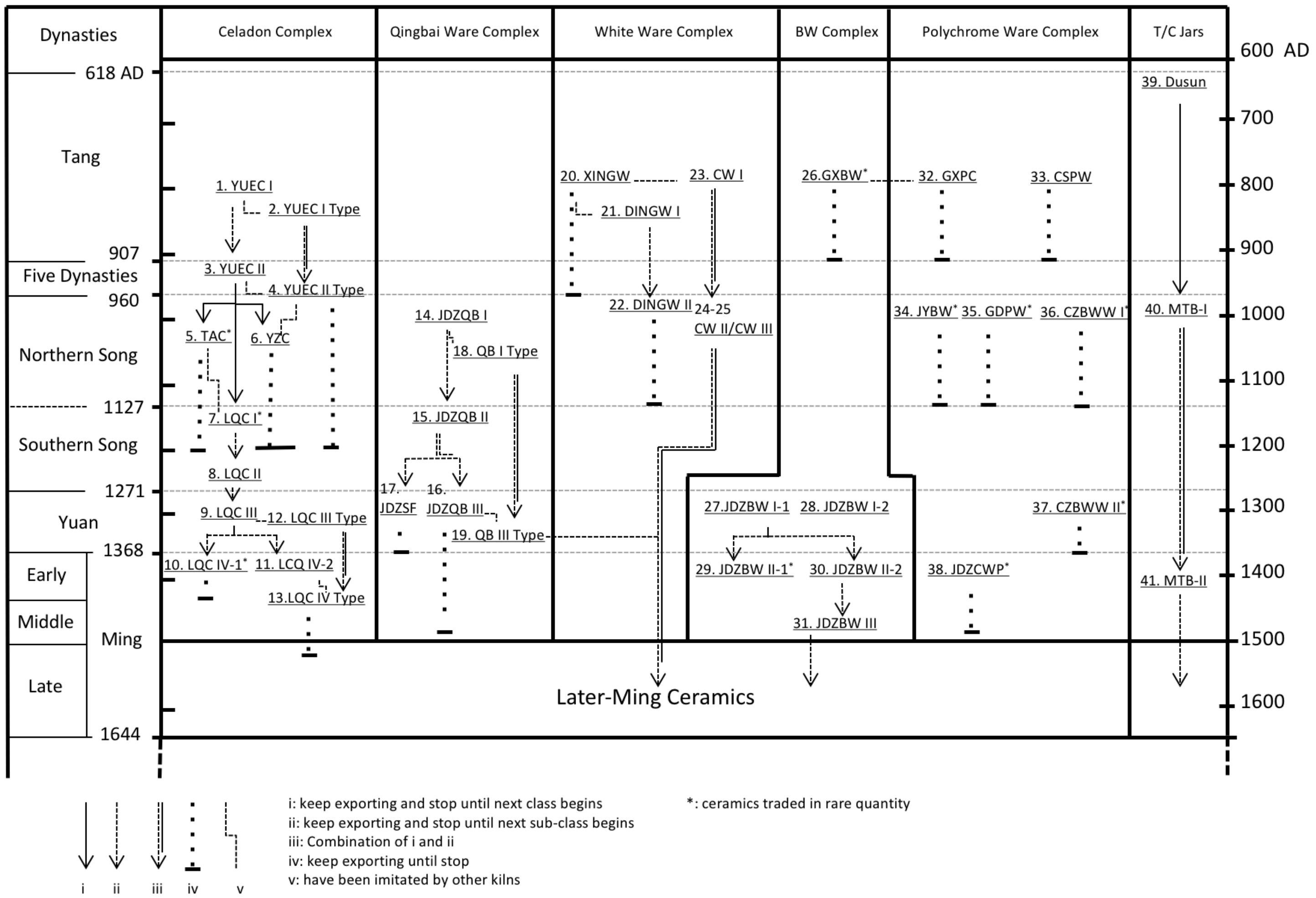


Table 4:2-2: Index of ceramic classes used in this study.

No.	Class Code	Class Name	No.	Class Code	Class Name
1	YUEC I	Early Yue Celadon	22	DINGW II	Ding White Stoneware/Porcelain in Song Dynasty
2	YUEC I Type	Early Yue-type Celadon	23	CW I	Early Coarse White Stonewares
3	YUEC II	Yue Celadon in the Five Dynasties and Song Dynasty	24	CW II	Coarse White Stonewares in Song Dynasty
4	YUEC II Type	Yue-type Celadon in Song Dynasty	25	CW III	
5	TAC	Tong'an Celadon	26	GXBW	Gongxian Blue and White Stoneware
6	YZC	Yaozhou Celadon	27	JDZBW I-1	Jingdezhen Yuan Blue and White Porcelain
7	LQC I	Early Longquan Celadon	28	JDZBW 1-2	
8	LQC II	Longquan Celadon in Southern Song Dynasty	29	JDZBW II-1	Jingdezhen Blue and White Porcelain in Early Ming Dynasty
9	LQC III	Longquan Celadon in Yuan Dynasty	30	JDZBW II-2	
10	LQC IV-1	Imperial-type Longquan Celadon in early Ming Dynasty	31	JDZBW III	Jingdezhen Blue and White Porcelain in Middle Ming Dynasty
11	LQC IV-2	Longquan Celadon in Ming Dynasty	32	GXPC	Gongxian Polychrome Stoneware
12	LQC III Type	Longquan-type Celadon in Yuan Dynasty	33	CSPW	Changsha Polychrome Stoneware
13	LQC IV Type	Longquan-type Celadon in Ming Dynasty	34	JYBW	Jianyang Black Stoneware
14	JDZQB I	Jingdezhen Qingbai Porcelain in Northern Song Dynasty	35	GDPW	Guangdong Polychrome Stoneware
15	JDZQB II	Jingdezhen Qingbai Porcelain in Southern Song Dynasty	36	CZBWW I	Early Cizhou Polychrome Stoneware
16	JDZQB III	Jingdezhen Qingbai Porcelain in Yuan Dynasty	37	CZBWW II	Cizhou Polychrome Stoneware in Yuan Dynasty
17	JDZSF	Jingdezhen Shufu Porcelain	38	JDZCWP	Jingdezhen Copper Red and White Porcelain
18	QB I Type	Qingbai Stoneware/Porcelain in Song Dynasty	39	Dusun	Dusun Transport Stoneware
19	QB III Type	Qingbai Stoneware/Porcelain in Yuan Dynasty	40	MTB I	Martabani Transport Stoneware
20	XINGW	Xing White Stoneware/Porcelain	41	MTB II	
21	DINGW I	Early Ding White Stoneware			

Chapter 2 described how the celadon producers (kilns) were widely distributed across both northern and southern China before the 12th century. After this period, although production in northern China declined, southern China still mainly produced celadon wares until the 15th century and the kilns were centred in Zhejiang and Fujian (Figure 2.15). In Chapter 3 it was noted that celadon wares were the second largest group of Chinese ceramic finds in the western Indian Ocean, after the blue and white ceramics. It can be seen that before the 15th century, celadon wares were one of the most popular commodities in the Chinese ceramic trade, especially during the 14th century. Imperial quality celadon produced in the Longquan kilns (龙泉窑) has been discovered on Hormuz Island in the Gulf (Lin and Zhang 2015) and in Kenya in East Africa (Liu et al. 2012, Qin and Liu 2012). This form of high-quality celadon was the first to be exported from China and is strongly linked to the voyages of Zheng He (Lin and Zhang 2015).

In this section on the celadon complex, the main aim is to introduce the key classes of celadon production from the 9th to 15th centuries. Through this complex the chronological development and changes to the Chinese celadon industry and exports can be observed.

In total there are 13 classes of celadon wares, and Yue celadon (YUEC) and Longquan celadon (LQC) are the two most important classes in this complex. Both of these classes are very good quality, with a historically high reputation. Imitations based on these two types of high quality celadon wares have long been produced, and these have been called 'Yue celadon type' (YUEC Type) and 'Longquan celadon type' (LQC Type). In these imitation classes, Tong'an celadon and Yaozhou celadon was also exported to the Gulf, but have rarely been reported in the western Indian Ocean (see Appendix 2). This may be due to a failure to identify Tong'an and Yaozhou celadon and/or historically they were only rarely traded to the western Indian Ocean.

In general, trading of Yue celadon wares mainly occurred in the period from the 9th to 12th centuries together with trade of their imitations. The Yue class can be roughly divided into two sub-classes, Yue celadon I (YUEC I) which dates to the late Tang period (about 9th to early 10th centuries) and Yue celadon II (YUEC II) which dates to the Five Dynasties and Northern Song period (about the middle 10th century to the early 12th century). The same pattern occurred for their imitations (YUEC Types I and II).

Following the Yue classes, Tong'an and Yaozhou celadon wares were exported to the western Indian Ocean in very limited quantities. All these early celadon productions were gradually replaced by Longquan celadon wares from the 13th century onwards.

Longquan celadon wares can be divided into five sub-classes according to Chinese ceramic archaeology. Early Longquan celadon wares (LQC I) have very rarely been reported at western Indian Ocean sites, and this class can be dated to the late 12th to early 13th centuries. Increasing quantities of Longquan celadon have been found in the western Indian Ocean dating from the late 13th century to 14th century, which consists of the classes LQC II and LQC III. In the very late 14th to early 15th centuries, Imperial type Longquan celadon (LCQ IV-1) was introduced to the Gulf and East Africa, as well as low quality ordinary Longquan celadon wares (LQC IV-2).

Together with the large increase in Longquan celadon imports, imitation Longquan celadon was produced in the Fujian and Guangdong regions of China. These mainly consist of LQC Type III and LQC Type IV, which were mainly imitations of ordinary Longquan celadon wares.

By the middle/late Ming dynasty (about the 16th century), the Chinese celadon industry experienced a rapid decline due to the rise in blue and white porcelain manufacturing. Longquan celadon wares were abandoned by trading markets during this period.

1. YUEC I (early Yue celadon)

(cf. ZJSKWWKGYJS et al. 2002, Ren and Xie 2002)

Body type: Stoneware **Origin: Zhejiang**

Drawing: see Appendix 6-Drawing 1: 1-12

Description

At least since the Three Kingdoms period (about the 2nd Century AD), the manufacturing of celadon wares has occurred in Zhejiang Province (Zheng 2009:18-19), which is located in southern coastal of China. One of the highest quality celadon productions had been fired in the Yue kilns (越窑) in the period from the Tang to Song dynasty (7th to 12th century), which is located in the Shanglin Lake area (上林湖) between Yuyao (余姚市) and Cixi (慈溪市) in northern Zhejiang (cf. CXSBWG 2002).

Glaze and body

Body: Stoneware in greyish white or grey; rarely in yellowish grey.

Glaze: Thin (about 0.25 mm) (Kerr and Wood 2004:528-529) and evenly applied glaze in light green, yellowish green, olive green.

Shapes

The shapes of YUEC I mainly consist of bowls, plates, jars, ewers, vases, handle cups and teacup supporters. YUEC I celadon bowls have a bi-disc footring on a thick base. The bi-disc footring is a short and wide shaped footring and its name comes from ancient Chinese Jade Bi (玉璧). However, a higher and narrower footring is very occasionally observed (Figure 4.1). The proportion of the mouth diameter and height is normally 3:1 for bowls, with the body shape normally being short and straight; a round shaped body is rare. The shape of the plates is similar to the bowls but flatter, and plate products normally also have a bi-disc footring.

Figure 4.1: Bi-disc footring and pine shaped separator marks of YUEC I.

Source: (Bronson 1996:189, Carswell et al. 2013:CD-CRW_3673)

Bowl: Short height with straight body, rarely round, a bi-disc footring is common, and size is small and common with no large bowls ever found.

Plate: Short height with a straight body, rarely round, a bi-disc footring is common, although a narrower footring has also been found, the size is in small and common, with no large plates ever found.

Decoration

A floral rim and wide rim on bowls and plates is commonly found. YUEC I celadon wares rarely have decorations, although incised decorations can be found, where a pattern of fish or stylised flowers has been outlined using very thin and single incised lines (ZJSKWWKGYJS et al. 2002).

Forming and Setting Features

Almost of all YUEC I bowls and plates have been wheel turned and well polished. Pine-shaped separators were used on the top of the bi-disc footring and marks from these can be seen on the top of the footring and sometimes on the inside surface of the wares. The number of pine-shaped marks is usually about 6 to 12.

Dating Evidence

Tombs and remains of YUEC I wares date from 668 to 900 AD (ZJSKWWKGYJS et al. 2002:374-375). The excavation of the underground palace of Famen Temple (法门寺) in Fufeng County (扶风县) of Shaanxi Province produced 16 pieces of Yue celadon wares, including bowls, plates and vases. These wares were coated by a yellowish green or green and smooth glaze, and the scars of mud separators can be seen on the interiors. Together with these Yue celadon wares, many glasswares and ceramics from the Persian Gulf were unearthed and these can be dated to the 9th century (Han et al. 1988:26). The underground palace is dated to no later than 874 AD (Han et al. 1988:5). Five Yue celadon jars with carved inscriptions were found in the Cixi and Yuyao area, which provide a series of absolute dating evidence for Yue celadon wares (separately dated to 823 AD, 842 AD, 866 AD, 887 AD and 900 AD) (Chen and Yi 1979, ZJBWG 1985, Zhang 1988, Fu and Gu 1990, Xu 1996, ZJSKWWKGYJS et al. 2002:375). These ewers basically have a similar glaze and body to finds of late Tang Yue celadon wares. The Belitung shipwreck also produced a large number of Yue celadon, which has been dated to the 9th century (Flecker 2001).

Distribution

The distribution of early Yue celadon wares spread widely across the western Indian Ocean. According to Table 6.7 in Appendix 5 (column of Celadon: KN 13), 18 out of 26 sites have produced early Yue celadon sherds. Particularly the sites of Mantai, Sri Lanka (Site 39), Siraf, Iran (Site 54), Sohar, Oman (Site 79) and Shanga, Kenya (Site 110) have yielded relatively large quantities of an early type of Yue celadon wares. Moreover, no more than 10 sherds have been distinguished by author's examination of the Williamson Collection, which are distributed in the south of Iran. They were originally classified as Longquan celadon (Priestman 2005:295-299). It can therefore be suggested that Yue celadon is a kind of common ceramic commodity in the trade from China to the western Indian Ocean in the 8th to 9th centuries.

2. YUEC I Type (early Yue celadon imitations, the sub-class of YUEC I)

(cf: Gong 1984, Yang 1985, 1994, ZJSBWG 2009)

Body type: Stoneware **Origin: Southern China**

Drawing: see Appendix 6-Drawing 1: 14-17

Definition

There are many sherds dated to the late Tang period (9th to 10th centuries) that share the shape and decorations of Yue celadon (Class YUEC I). In many cases they are easy to be distinguish from the Yue celadon, but it is difficult to identify where they were originally produced. Possible producers of Yue type celadon wares are listed in Table 4.3. These wares basically have a lower quality body and glaze. To some extent, they have been regarded as imitations of Yue celadon wares because they have very similar shapes, such as the bowls and plates. YUEC I Type wares mainly come from kilns located in Zhejiang and Guangdong Provinces. Changsha and Fujian also produced these Yue type wares. Wares from part of the kilns in Fujian and in Jingdezhen and Anhui provinces will not be introduced in this class due to their products not having been confirmed as exported to the western Indian Ocean.

Table 4.3: Key producers for YUEC I Type

Province	Producers
Zhejiang	Wu Kilns (婺州窑), Ou Kilns (瓯窑)
Guangdong	Meixian Kilns (梅县窑)
Hunan	Changsha Kilns (长沙窑)
Fujian	Jianyang Niupilun Kilns (牛皮崘窑)

Detailed description and dating evidence

Detailed descriptions and dating evidence will be separately introduced for the key producers of YUEC I type ceramics.

Meixian celadon wares

The Meixian kilns were located in Meixian County in Guangdong Province. Various qualities of celadon was produced in the Meixian kilns and this group of celadon products are of higher quality, and regarded as imitations of Yue celadon (Qin 2013:39-40). It should be noted that Meixian celadon may also come from Chaozhou kilns (潮州窑), as both were producing high quality celadon in the late Tang period (Krahl et al. 2010:194).

Meixian celadon wares have a thin and evenly applied greyish green or light green glaze, and crackles in the glaze are commonly found. They have been fired at a high temperature and the body is therefore very dense and grey or whitish grey in colour, although bodies fired at low temperatures can be found. Rare inclusions can be seen in the clay using the naked eye.

Meixian celadon bowls have a similar shape to Yue celadon bowls (in group CY-1). It is highly possible that local kilns in Guangdong were imitating the shapes of the high quality ceramics from the Yue and Xing (邢窑) kilns.

Like the Yue celadon bowls, the high quality Meixian celadon bowls also in the ‘Tang style’, with a bi-disc ringfoot on a low and flat base with a short but straight body and a contracted rim. A floral rim with four petals is common. Plate products also have bi-disc ringfoot, which is low and flat, and the body shape is short and straight. Like Yue celadon, only rarely are objects from the Meixian kilns decorated.

Dating for Meixian wares

No dating evidence has been found from archaeological kiln sites and only limited evidence has been discovered from the tomb sites in Guangdong. Six Tang tombs were found in 1987 in Meixian County, and whilst no datable tombstone was recovered, based on the tomb structure, the tomb numbered Meishe M4, is well preserved and provides dating evidence in its small, thin and non-decorated tomb bricks that can be attributed to the Tang dynasty (Gu 1987:211-215). 'Kai Yuan Tong Bao (开元通宝)' coins (Kai Yuan, a Tang reign era from 712-742 AD) have also been discovered.

A bowl and a dish found in Meishe M4 are similar to the ceramic finds from another tomb in Meixian County unearthed in 1955. This is a dated tomb based on a tomb brick with the inscription; 'Shen Long Yuan Nian' and dated to 705 AD (Yang 1956:29-30).

Care needs to be taken with the ceramic bowls from these Meixian tombs as they are from an earlier age than the high quality celadon in the CDHMX group; their bodies are loose, relatively soft, and coated with a thin and transparent yellowish green glaze. This is different from late Tang Meixian celadon bowls which have a dense body and a green glaze on a bi-disc ringfoot.

A set of high quality Meixian celadon was found in the Belitung shipwreck, which was dated to the late Tang period based on an inscription on a bronze mirror and other datable bowls; therefore, this set of Meixian celadon bowls are thought to be the same age (Krahl et al. 2010:35-37).

Wuzhou and Ou celadon

The Wuzhou kilns and Ou kilns are neighbouring kilns of the Yue kilns, and are all located in Zhejiang Province. Archaeological research and understanding of these two kilns is very limited, but it has been confirmed that both were famous for firing celadon and continued to do so into the era of the northern Dynasty (ZJSBWG 2009:7-9).

The author visited Zhejiang Provincial Museum in 2010 to examine the celadon sherds found in Zhejiang Province. Some examples of Wuzhou and Ou celadon were studied, and were found to have a very close shape and decorative style to Yue celadon. It is difficult to distinguish these sherds from Yue celadon, but they have their own fabric features that are helpful for a rough identification.

The Ou celadon has a light greyish white body, which is hard, smooth and pure, although for some examples the body is light yellowish grey. The glaze is normally a lighter greyish green or yellowish green, and looks like it has been unevenly applied. The pine-shaped separator marks are grey, whereas Yue celadon marks are normally white or yellowish white. Wuzhou celadon has a reddish grey body and the areas exposed on the lower part of the wares and on the base has been stained a strong red/brown, which may be due to the higher percentage of iron in the clay. The glaze normally consists of two colours of reddish or brownish green and greyish green.

Niupilun Celadon wares

Niupilun kilns are located in Jianyang City of Fujian Province but no archaeological evidence can support its dating. According to the shapes and decoration, the wares look very similar to Yue celadon. Therefore, it is believed that its heyday was during the late Tang period into the Five Dynasties era (Fu et al. 1990:38). Niupilun celadon wares have been high-fired, and have a hard but rough body with many small black inclusions, which gives it a coarse feel when touched. The glaze is thin and is yellowish green or greyish green. Normally the wares have been half glazed on the outside surface. No incised or carved decorations have been found, although a floral rim consisting of four petals is common (Fu et al. 1990:37).

Changsha Celadon wares

Less than half of the ceramics produced from the Changsha kilns in Hunan Province are monochrome wares, and celadon wares account for approximately 42% of all wares produced here (CSYKTZ 1996:26). It should be noted that after about the 8th century, polychrome underglaze painted wares produced in Changsha kilns became popular (CSYKTZ 1996:25), consequently the celadon wares produced here may not have been for export.

Changsha celadon has a high-fired body, which is greyish white or dark grey. It is difficult to standardise the celadon shapes of Changsha wares because they are formed and glazed freely, in comparison to Yue celadon wares. Normally, the wall of the bowls or plates is thin but the base is thick. A bi-disc can be found in addition to a low, narrower and ex-turned footring. Wares are typically half glazed on the outside surface and the glaze runs down to the base, although many examples of fully glazed wares can be seen (Zhou 1982, CSYKTZ 1996:510-511).

3. YUEC II (Yue celadon)

(cf. Ren and Xie 2002, ZJSKWWKGYJS et al. 2002)

Body type: Stoneware **Origin: Zhejiang**

Drawing: see Appendix 6-Drawing 2: 1-11

Detailed description

Glaze and body

The body of YUEC II wares is similar to those of YUEC I wares, and are pure, hard and grey (Figure 4.2, right). No change occurred to the body mainly because no improvements had been made to the clay. However, the technique for making celadon and the placing and firing methods were improved in the 10^{th} century. Sealed saggar firing was widely applied in the Yue kilns and in many other kilns in China (ZJSKWWKGYJS et al. 2002:353-361). Yue celadon wares in the Five Dynasties to the Northern Song era have a jade-like thin glaze, but because of the uneven atmosphere in the kiln this glaze is thin and appears as different colours: yellowish green, olive green, bean green, light green and greyish green (Figure 4.2, left) (cf. ZJSKWWKGYJS et al. 2002).

Shapes and decorations

Yue celadons produced for export in the Five Dynasties and Northern Song period have a higher and thinner footring and the bi-disc footring has been abandoned, which makes YUEC II wares easily distinguishable from YUEC I ware (Figure 4.3). In the YUEC II class the shape of the bowls is much higher and the body is turned, although examples of a straight body can also be found. The proportion of the mouth to height has changed to be 2:1 and floral rims are more common than in YUEC I wares.

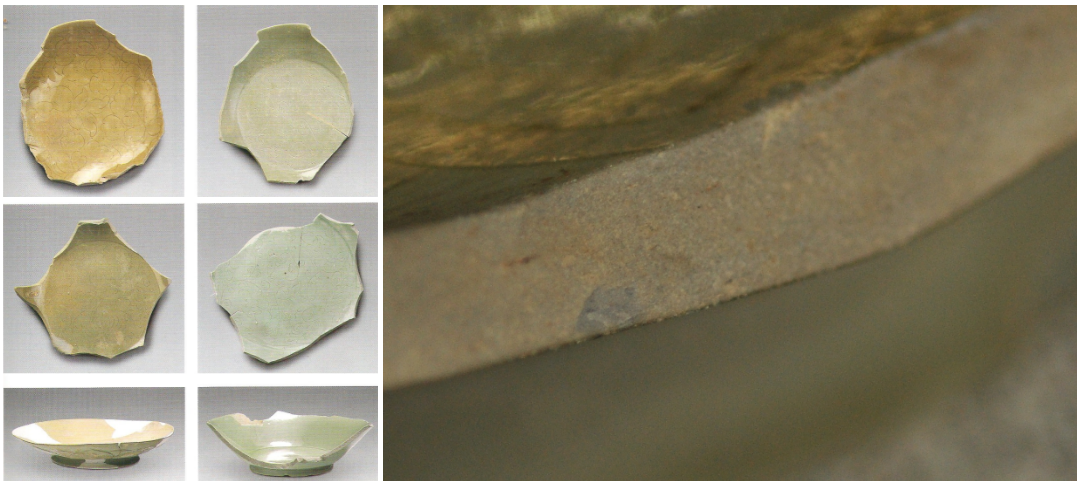


Figure 4.2: Glaze Colours of TYC-2 (left) and Yue celadon ware body.

(cf. ZJSKWWKGYJS et al. 2002) and Yue Celadon Body (right) (Photograph by Ran Zhang)

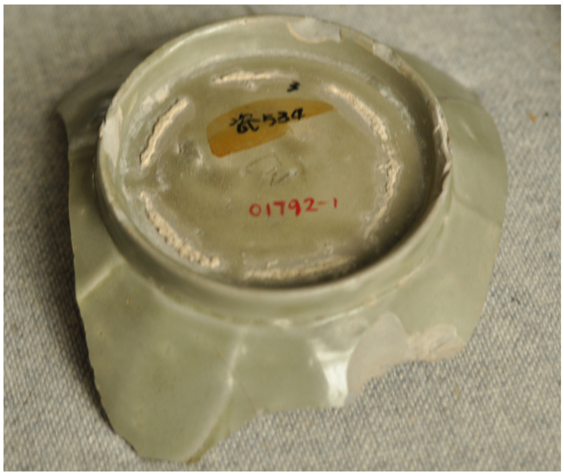


Figure 4.3: Footring of a bowl from class YUEC II.

(Housed in the Zhejiang Provincial Museum, Hangzhou, photograph by Ran Zhang)

The YUEC II class covers a long period of approximately two hundred years, during which time the shapes of wares changed. Evidence from the Silongkou site suggests the YUEC II class has four sub-groups, with group I dating to the five dynasties (907-960 AD - see below). The ware looks similar to YUEC I wares but the footring is ex-turned, narrower and higher. Group II is dated to the early Northern Song dynasty (from about 960 to the early 11th century), and the height of bowls is higher and the mouth to height is turned to be approximately 2:1, while the ex-turned footring is higher and thinner (Figure 4.3 and Drawing 2). The walls of the bowls and plates are round and this shape continues into group III wares but with a higher height, and this group is dated to the middle Northern Song period (approximately the 11th century). Group IV wares date to the 12th century, are smaller and a conical body is common, although a round body can also be observed. The ex-turned footring is very high and thin.

Wood needle-carved designs as decorations became common, especially during the Northern Song dynasty. These designs are normally single-lined simple patterns, such as birds, flowers, butterflies, dragons or fish. In addition, moulded, knife-carved and hollow carved designs are also common (Feng 2009:338). These decoration methods were used until the late Northern Song and early Southern Song period (ZJSKWWKGYJS et al. 2002:361-362). Selected carved or incised patterns of YUEC II wares are shown in Appendix 6 (Pattern 1).

Dating evidence

Some key dating evidence from kiln sites provides direct dating evidence that is very helpful in understanding the development of Yue celadon wares. For example, the Silongkou site (寺龙口) of Yue kilns produced a saggar sherd which is dated between 911 and 915 AD based on its carved inscription of Qian Hua Nian Qi Yue Nian Liu Ri (乾化年七月廿六日: 26th July of Qian Hua Reign), which allows other celadon products from the same layer of this site to also be dated to the Five Dynasties period (ZJSKWWKGYJS et al. 2002:367). The site at Shanglinhu Lake produced a Yue celadon base-sherd, which has a carved dating of Tai Ping Wu Yin (太平戊寅: the Peaceful Era of Wu Yin) which attributes it to about 978 AD (ZJSKWWKGYJS et al. 2002:376).

Over 20 tombs and remains of Yue celadon wares have been dated to 909 to 1159 AD, which suggests that Yue celadon continued to be fired into the Southern Song dynasty (ZJSKWWKGYJS et al. 2002:375-376). However, the heyday for exporting Yue celadon wares was during the Five Dynasties to the late of Northern Song period, which can be determined through the many archaeological excavations in the Indian Ocean, such as the Intan shipwreck, and the Siraf, Fustat and the Shanga and Manda sites in East Africa (Chittick 1967, Whitehouse 1973, Chittick 1984, Horton et al. 1996, Flecker 2002, Qin and Gu 2007:183-189, Yuba 2014).

Distribution

The distribution of the later Yue celadon (YUEC II) is not as wide as its early type (YUEC I) in the western Indian Ocean. According to Table 6.8 in Appendix 5 (column KN13 of Celadon), among 37 sites only 11 have yielded the late Yue celadon. It can therefore be suggested that there was a clear decline in the trade of later Yue celadon wares in comparison with the early type and they are overwhelmingly distributed in Fustat (97% of 971 sherds in total). This might be an indicator that the trade in Chinese ceramics had shifted from the Gulf to the Red Sea in the 10^{th} /11^{th} centuries. Otherwise, the sites of Darasuram (Site 8), Sanjan (Site 34) in India, Polonnaruwa, Sri Lanka (Site 40), Kush, UAE (Site 65), Sharmah, Yemen (Site 94) and Quesir, Egypt (Site 102), have only produced very small quantities of later Yue celadon sherds.

However, it should be noted that there is a high possibility that some reports might mix these two classes of Yue celadon wares. For instance, the dating and counting of the Yue celadon sherds at Mantai, Sri Lanka (Site 39) is unclear and confused (Carswell et al. 2013:239-245) and there is similar uncertainty at Siraf (Site 54) (Tampoe 1989). Although these reports mention that Yue celadon wares were traded from the late Tang to early Song periods, they do not provide a clear grouping and quantification of them. Hence, in this thesis, the Yue celadon sherds from these sites have to be classified as the earlier type of Yue celadon because of the site's dating.

4. YUEC II Type (Yue celadon imitations, the sub-class of YUEC II)

(cf. Zeng and Wu 1977, Gong 1984, Yang 1985, GZSWWGLWYH and AMOCUH 1987, Yang 1994, ZJSBWG 2009):

Body type: Stoneware **Origin: Southern China**

Drawing: see Appendix 6-Drawing 2: 12-21

Definition and dating

This class mainly consists of Guangdong made celadon wares, which combine the shape and decoration features of both Yue celadon wares and Yaozhou celadon wares. Three main kilns located in Guangdong produced celadon wares for trading. The

Xicun kilns (西村窑) and Huizhou kilns (惠州窑) date to the Northern Song dynasty and gradually stopped firing during the late Northern Song to the Southern Song period (Zeng and Wu 1977, GZSWWGLWYH and AMOCUH 1987:50-51). The third is the Meixian kilns, whose wares were popular during the Tang dynasty (YUEC I Type) and celadon firing continued into the northern Song dynasty, although products of this class were not common (Zeng and Wu 1977, GZSWWGLWYH and AMOCUH 1987, Yang 1994, Heng 2005:61-62). It appears that celadon imitations from Fujian are very rare in this class (Heng 2005:71-73), while those from Tong'an kilns (同安窑) are common and will be discussed as the separate TAC class (Tong'an celadon).

Description

In general, the wares from Guangdong kilns have a grey, hard and pure body but in some examples the body contains iron oxide, grit and other inclusions. The colour ranges from greyish white, yellowish grey, orange and brick red, although the latter is rare. The colour of celadon is not stable, and ranges from greyish green, jade green, bean green, light green, dark green, yellowish green to yellow (FPSM 1985, GZSWWGLWYH and AMOCUH 1987:34-35).

In the term of shapes, YUEC II Type wares are slightly different in comparison to YUEC II wares. One distinguishing feature is that the footring of YUEC II wares is relatively thicker, lower and more vertical on the base in comparison with Yue celadon, where the footring is clearly ex-turned and thin. However, it should be noted that ex-turned footrings are also observed on YUEC II Type wares. Huizhou bowls normally have a multi-lined decoration or a moulded and chrysanthemum petal-like pattern on the outside surface (Figure 4.3b). Xicun wares normally have a single-lined pattern or a single-layer and wide lotus petal decoration on the outside surface (Figure 4.3c). An outside floral pattern can be found on Yue celadon but is very different, normally consisting of a three-layered relief lotus-petal pattern (Figure 4.3a).

It can be seen that both Xicun and Huizhou wares were imitating Yue celadon and Yaozhou celadon during the Northern Song dynasty. The incised and carved patterns in YUEC II type wares were mainly copied from Yue celadon (YUEC II) and the moulded patterns come from Yaozhou celadon (YZC) (Pattern 2 in Appendix 6).

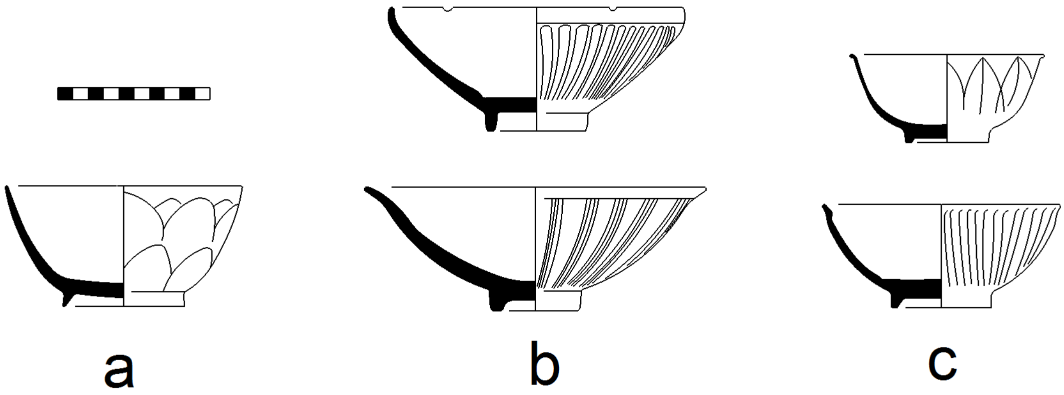


Figure 4.4: Outside decorations on YUEC II and YUEC II Type wares.
a=Yue celadon; b=Huizhou celadon; c=Xicun celadon
(Drawing by Ran Zhang)

<u>5. YZC (Yaozhou celadon)</u>

(cf. SXSKGYJS 1965, SXSKGYJS and YZYBWG 1998)

Body type: Stoneware **Origin: Shaanxi**

Drawing: see Appendix 6-Drawing 3: 1-4

Definition

The Yaozhou kilns (耀州窑) were located in the town of Huangpu (黄堡镇) southwest of Tongchuan city (铜川市) in the Shaanxi Province of northern China, and had a long history of producing ceramics. Their most famous ceramic product is celadon during the Northern Song dynasty (960-1127 AD), whilst in the Tang dynasty (618-917 AD) they were also famous for producing Sancai potteries. For these celadon products, they are notable for their deep carved and moulded decorations, and their olive green glaze. And they have a good historical position in China, as they were sent to the Song central court as tribute ceramics.

Detailed description

Glaze and body

Yaozhou celadon normally has a grey body, which is thin, dense and pure. The unglazed area on the footring where the body is exposed is usually red-stained due to iron in body oxidising during firing and then coating onto the body.

The glaze of Yaozhou celadon is thin and is in variations of green, such as olive green or yellowish green, and sometimes light green. In comparison to Yue celadon, it is a darker green and appears more shiny and glistening, while compared to Longquan celadon, Yaozhou celadon normally has a glass-like glaze rather than a jade-like glaze.

Shape and decoration

Like other ceramics produced during the Song dynasty, Yaozhou celadon has a thin and small-scale shape. The diameter of a bowl or plate is never larger than 30cm and is normally about 10 to 20cm. The principal shapes of Yaozhou celadon consist of teacups, bowls, plates, cup-stands, jars, vases, ewers and incense burners. It has been found that some bowls from the early Northern Song period (about 960-1022 AD) have a floral rim representing a lotus or a flower, with a flat base and a large, wide footring. Bowls from the middle and late Northern Song period (1023-1127 AD) have a sunken base with a smaller, narrow footring.

Yaozhou celadon can be distinguished by their decorations, and some bowls and plates are decorated on both the inside and outside. The outside surface normally has a carved pattern of multi-layer floral petals or carved lines, while the inside surface has a much more complicated pattern than the outside. Normally, a piece of Yaozhou wares would have been fully decorated with carved, incised and moulded patterns using a flower motif. Alternative patterns, such as birds, fish, dragons and playing children can also be found but are rarer in trading wares (SXSKGYJS and YZYBWG 1998, Feng 2009).

Dating evidence

Dating from the excavations at Huangpu kiln site revealed four periods: period 1, the early Northern Song period (960-1022 AD); period 2, the middle Northern Song period (1023-1085); period 3, the late Northern Song period (1086-1127 AD); and period 4, the early Southern Song period covering about 16 years (1127-1124 AD). This dating is mainly based on unearthed coins (SXSKGYJS and YZYBWG

1998:541-542), with the earliest coin bearing the inscription 'Tai Ping Tong Bao (太平通宝)' and dating to the period from 976 to 984 AD. The emperor reign names moulded on ceramics also suggest that they belong to the period of Xi Ning (熙宁, 1068-1077 AD), Da Guan (大观, 1107-1110 AD) and Zheng He (政和, 1111-1118AD). Therefore, Yaozhou celadon can be dated from the late 10th century to the early 12th century.

The Intan shipwreck yielded no Yaozhou celadon and this might suggest that these wares were not being exported before the late 10th century (Flecker 2002). Moving into the Southern Song era, production at the Yaozhou kilns declined and the typical olive green and carved Yaozhou wares stopped being produced. Consequently, the export of Yaozhou celadon ended during the early 12th century.

Distribution

Only a small quantity of Yaozhou celadon has been found in the Indian Ocean. According to Table 6.8 in Appendix 5, only five sites in the western Indian Ocean reported finds of Yaozhou celadon sherds. One sherd has been reported at the site of Yapahuwa, Sri Lanka (Site 45). Sharmah (Site 94) also yielded a very small quantity of Yaozhou celadon and also Yaozhou type sherds (Zhao 2006), which were made in southern China and should belong to the subclass YUEC II Type according this classification. Fustat in Egypt (Site 101) also yielded a group of about 25 sherds of Yaozhou celadon wares (Yuba 2014), and Kilwa (Site 108) reports a single sherd attributed to the Yaozhou celadon. Moreover, Siraf (Site 54) yielded a small piece of Yaozhou celadon sherd, which was examined by the author but not reported by Tampoe Tampoe (1989).

6. TAC (Tong'an Celadon)

(cf. FJSWWGLWYH 1958, Li 1974)

Body type: Stoneware **Origin: Fujian**

Drawing: see Appendix 6-Drawing 3: 5-9

Definition and dating

Celadon wares produced in the Tong'an kilns in Fujian Province have been rarely reported at western Indian Ocean sites but the export og Tong'an celadon to East Asia and south east Asia is widely reported (Heng 2005:121, 340, Pearson 2007:129, 140). There are no reports of Tong'an finds from sites at Fustat, Siraf, and Sharmah in Yemen, nor at Julfar and East Africa (Horton et al. 1996, Kennet 2004, Zhao 2006, Yuba 2014). This phenomenon is very strange. Consequently, great care is needed when identifying celadon sherds. It seems very likely that Tong'an celadon was potentially introduced into the western Indian Ocean.

Tong'an celadon was manufactured in many kilns and was imitated by other local kilns in Fujian (Tong'an type), such as at the 25 kilns at Pucheng (浦城窑), Nanping (南平窑), Putian (莆田窑), Zhangpu (漳浦窑), Anxi (安溪窑), Dongshandao (东山岛窑) and also at many other kilns (Lin 1990:391, Zeng 2001:163, Huo and Lin 2004:11). According to research on the Tong'an kilns and these other kilns, the firing of Tong'an celadon (include Tong'an tyle) continued into the Yuan dynasty (Lin 1990:391-394).

Dating for exported Tong'an ceramics can be roughly ascribed as from the 11th to 14th centuries. The Intan shipwreck did not yield any Tong'an celadon, which suggests that export commenced later than the 10th century (Flecker 2002). It was exported during the middle and late Northern Song dynasty (approximately the 11th to 12th centuries) but was gradually replaced by Longquan celadon wares from the time of the late Southern Song dynasty to the Yuan dynasty (about the second half of the 13th to early 14th century). According to archaeological sites in Japan and the eastern Indian Ocean, the export of Tong'an wares was popular during the late Northern Song to the early Southern Song dynasties, and it continued into the Yuan period (Lin 1990:394-395, Heng 2005:127, 339).

The fabric, shape and decoration of Tong'an wares will be simply introduced. One of the key points for this class is to determine the distinguishing features between Tong'an celadon and Longquan celadon.

Description

Body, glaze, shape and decorations

TAC has a rough, hard and grey body with many small inclusions. The colour is greyish white and grey, with the glaze as thin as on Yue celadon, and greyish green or yellowish green. On the inside surface there is normally an unglazed ring present.

Tong'an celadon wares have been quickly wheel-turned. Bowls are the objects mainly produced, although plates, jars, dishes, vase cups, ewers and incense burners have also been found. Bowls normally have a round body with a thick base. The footring and base are rough and no refined polish processes have been applied to them. The base is uneven with evidence of spinning marks and chatter-marks, and is normally unglazed.

The decorations which feature on Tong'an wares are floral scroll patterns carved using a knife and comb. Single lines or triple lines can be found on both the inside and outside surfaces. On the interior, the floral pattern consists of both combed lines and knife lines with dotted lines or designs, whereas the outside surface normally has straight lines made by a knife or comb. During the late Southern Song to Yuan dynasty period, carved lotus petal patterns are also seen. All the outside patterns have only a single layer, which is different from Yue celadon (YUEC II) (Pattern 3).

In comparison with Longquan celadon (classes LQC I and LQC II), Tong'an celadon has a lower quality: (1) Longquan celadon has a grey or greyish white body, which is pure, hard and smooth, whilst the fabric of Tong'an celadon is very rough; (2) Longquan celadon has a thicker glaze, normally bluish green, green or bean green, while Tong'an celadon has a yellowish green glaze, which is much thinner; and (3) the footring on Longquan celadon is perfectly refined and the glaze is fully applied to the base, while Tong'an wares have a thick base with a footring that is normally unglazed and poorly formed (Lin 1990:394).

7. LCQ I (early Longquan celadon)

(cf. Zhu 1998, ZJSWWKGYJS 2005)

Body type: Stoneware/porcelain **Origin: Zhejiang**

Drawing: see Appendix 6-Drawing 4: 1-4

Definition and dating evidence

Longquan celadon was produced in the kilns of Longquan City (龙泉市), and over one hundred individual kilns have been found (Krahl 1986c, Qin and Liu 2012). Well-excavated archaeological research from the Dayao kiln sites (大窑窑址), Jincun kiln sites (金村窑址), Xiaomei kiln sites (小梅窑址) and Fengdongyan kiln sites (枫洞岩窑址) provide a good understanding of the development of Longquan celadon.

The early type of Longquan celadon wares (class LQC I) in this classification can be dated to the 12th to the 13th centuries, but this type has rarely been found in the western Indian Ocean. LQC I wares have been regarded that strongly influenced on the Tong'an celadon (Li 1974:84), and this group of wares has been individually discussed as class TAC.

The Longquan kilns have a long history, and the Jincun kilns at Longquan city suggest that the earliest Longquan celadon may go back to the 11th century (Zhang 1989a:88-89, Zhu 1989b:5). During this period Longquan celadon was an imitation of Yue wares and similar to Tong'an celadon. Its own style featuring a jade-like and thick glaze had not yet been developed. Its imports in the western Indian Ocean have been very rarely reported. For example, Shanga (Site 110) has reported that five Longquan (type) celadon sherds could be dated to the 11th to early 12th centuries according to site layers (Horton et al. 1996:273). This has been questioned by Seth Priestman for incorrect classification (Priestman 2013:Table 5.19).

Typical Longquan celadon began to be produced in the middle of southern Song period (1127-1271 AD), and wares were immediately popular in both the domestic and export markets (Ho 1994a:xiv-table 2, Heng 2005:82). The shipwreck of Pulau Buaya located in the Lingga Archipelago of Indonesia dates no later than the 12th century and has no Longquan celadon but a large quantity of Qingbai wares, which suggests that Longquan celadon wares at this time was not yet popular (Ridho and Mackinnon 1998:V). The export of Longquan wares to the western part of the Indian Ocean commenced in the 13th to 14th centuries, which seems to be after the export of Longquan wares to Southeast Asia had begun (Krahl 1986c:253-256, Morgan 1991:71, Kennet 2004:64, Priestman 2005:295).

Description

Because wares belonging to class LQC I (a large group which occurred between 1100 and 1250 AD in the Indian Ocean) are absent from the western Indian Ocean (it has been mentioned that the early Longquan celadon wares have been found at Fustat in Egypt separately by Hou Yubo and Mikami Tsugio but this cannot be verified) (Hou & Mikami's reports, see in Qin 1995:87: note 1), this class will be simply introduced by body, glaze, shape and decoration.

LQC I wares have a stoneware body of good quality, which is pure, hard, without inclusions and light grey. The glaze is normally yellowish green or light green, and is thin. The shape of the bowls is deep and all wares have an uneven and thick base, which is sometimes unglazed. The footring is wide and low.

Decoration is of two main types. The first type has a floral scroll which has been quickly and freely carved on the interior and straight-line decorations carved on the outside, which is very similar to Tong'an celadon (class TAC). This type of decoration is normally in a yellowish green glaze, and is regarded as belonging to an earlier group that can be dated as far back as the late Northern Song dynasty (about the 11th century to 1127 AD). The second decoration type has an 'S' shaped lotus-petal pattern carved on the interior, which is frequently found on bowls, although the floral scroll pattern may also be seen; no decoration is applied on the outside. This type normally has a light green glaze and is regarded as belonging to a later group, dating from the Southern Song period (from 1127 to about 1250 AD).

8. LQC II (Longquan celadon)

(cf. Zhuang 1994, Zhu 1998, ZJSWWKGYJS 2005, ZJSWWKGYJS et al. 2009)

Body type: Stoneware/Porcelain **Origin: Zhejiang**

Drawing: see Appendix 6-Drawing 4: 5-12

Definition of LQC II

LQC II wares can be roughly dated to the late Southern Song to the early Yuan dynasty (the second half of 13th century to the early 14th century). Before this period Longquan celadon had already been manufactured for at least two hundred years but no archaeological evidence of traded Longquan celadon before the 13th century has been found in the Indian Ocean. Confirmed and commonly accepted traded Longquan wares can be dated to the late Southern Song dynasty, and belong to class LQC II.

No precise dating evidence supports this division and this sub-class is based on both archaeological material from the Indian Ocean and the initial excavation report of the Dayao Fengdongyan kiln site. This division is not based on a change in historical dynasties and it is difficult to tell the difference in some cases between wares from classes LQC II and LQC III. Some features may be useful for distinguishing between them based on the size of the wares and the slight change in the glaze, as LQC III wares have a slightly thinner and bean green glaze. More features of class LQC III will be described in next section but it can be seen that the changes in these features are very slight in comparison to class LQC II.

Detailed Description

Glaze and body

Class LQC II Longquan celadon has a very thick, jade-like and green glaze. In this period the glaze shows some variation in the greenish colour, such as olive green, bluish green and light green, but only rarely is yellowish green seen. The body is fine and fully glazed, and only where the body is exposed at the footring is there a small area where no glaze can be seen. Longquan celadon has a good quality, dense and light grey stoneware/porcelain body. The body is thin and the footring is small and well-polished.

Shape and decoration

Exported Longquan celadon has some variation in shapes and decorations. Bowls and plates area very common; bowls have a wide mouth, round body and a thin and small footring, while plates have a projecting rim, a round and short body, with thin footring. The outer surface is decorated with lotus petals in relief, with carved petal single outlines. This lotus petal decoration is very common on exported Longquan celadon bowls, plates and jars. On the inside of the plates two fully glazed fish located at the centre of the base are commonly seen, while chrysanthemum petals in relief, and a carved or moulded floral pattern on the inside of bowls and plates, are rarely seen.

Dating evidence

Table 4.4 lists a set of archaeological tombs containing Longquan celadon that can be dated to 1268 to 1320 AD. The Shi Shengzu Tomb in Quzhou City of Zhejiang Province yielded a set of Longquan celadon bowls with lotus petals in relief. Based on the tombstone, these wares can be dated to the tenth year of the Xian Chun Reign (咸淳十年, 1274 AD) (QZSWGH 1983). Similar bowls have also been found in the tomb of Pan Shi in Lishui City in Zhejiang Province. A tombstone with an inscription from the first year of the De You Reign (德佑元年) dates to 1275 AD (ZJSBWG 2000). Therefore, according to these tombs class LQC II wares can be dated to 1268 to 1320 AD and further dating evidence is listed below.

Table 4.4: Key dating evidence for class LCQ II

Tomb Owners	Locations	Findings	Dating	Reference
Wu Ao	Deqing, Zhejiang	Vase	1268 AD	(Zhu 1998: 154)
Shi Shengzu	Quzhou, Zhejiang	Bowls	1274 AD	(QZSWGH 1983)
Pan Shi	Lishui, Zhejiang	Bowls	1275 AD	(ZJBWG 2000)
Xianyu Shu	Hangzhou, Zhejiang	Vases	1302 AD	(Zhu 1998:200)
Tie Ke	Beijing	Bowls and Plates	1313 AD	(BJSWWYJS 1986)
Unknown	Xuzhou, Jiangsu	Vase	1320 AD	(Qiu and Xu 1993)

Key identification points

Compared to class LQC III, LQC II celadon wares have a relatively smaller size;

normally, class LQC II small bowls have a mouth diameter of 6 to 10 cm, a height of 4 to 6cm and a base diameter of 3cm, while large bowls have a mouth diameter of 16 to 20cm, a height of 8 to 10cm and a base diameter of 5cm, although exceptions can be found.

The footring of Longquan celadon bowls and plates from class LQC II is well-polished. It has a thin foot wall and a pointed or thin and flat top. Where the body is exposed at the top of the footring foot, a narrow area of no glaze can be clearly seen. The inside area of the footring is evenly full glazed (Figure 4.5).

Bowl

Plate

Figure 4.5: The Footring of a class LQCII bowl and plate.

(ZJSWWKGYJS et al. 2009:12, Figures 1 and 2)

The thick, green glaze is an important feature of class LQC II wares, and the thickness of the glaze is 1 to 2 mm because it has been applied three to five times

(Qin & Liu, 2012). The glaze has some variation in the green colour, but the jade-like green glaze has been very well controlled. Rare reddish green, yellowish green and greyish green glaze examples have been found.

9. LQC III (Longquan celadon)

(cf. Zhuang 1994, Zhu 1998, ZJSWWKGYJS 2005, ZJSWWKGYJS et al. 2009)

Body type: Stoneware/Porcelain **Origin: Zhejiang**

Drawing: see Appendix 6-Drawing 5:

Definition of LQC III

Class LQC III wares can be dated roughly to the middle of the Yuan dynasty (the middle of the 14th century). During this period celadon wares became larger and thicker, and were a slightly lower quality but very similar to class LQC II wares. The lower quality is represented by the badly-polished, unglazed footring and thinner glaze. Based on the archaeological excavation at Fengdongyan kiln sites, small size (as small as in class LQC II) wares may be found but only in small quantities.

Detailed description

Glaze and body

The key feature of class LQC III is a thicker body and thinner glaze compared to class LQC II. Celadon wares of class LQC III have a heavy, relatively loose and light greyish white body. The glaze shows some variation in colour, for example light bluish green, bean green, olive green, greyish green and yellow. The thickness of the glaze is thinner than in class LQC III and is normally no thicker than 1mm. Crackles are very common and where exposed at the base or footring, the body is orange yellow or red.

Shape and decoration

Celadon bowls and plates in this class have a high and thick walled footring. Plates have an unglazed top at the footring and the foot is thick, flat and in-turned. Rarely, plates have an unglazed ring on the interior of the footring, which was a new method of kiln firing during the Yuan dynasty. Bowls normally have a fully unglazed footring and base.

Decorations can be commonly found on these celadon wares compared to class LQC II, and the main methods for decorating are carving and moulding. In some cases attached or applied decorations are found. Decoration patterns consist of lotus petals, chrysanthemum petals, lotus sprays, chrysanthemum sprays, two fish, a dragon with four claws, birds, deer, a phoenix with flowers, moulded 'Yang Lian Wen' lotus petals with ashtamangala (eight auspicious signs of Buddhism), squared spirals, scrolling flowers, and the Buddhist symbol 卍. Bowls and stem cups have carved lines on the body with spots and floral designs. A pattern of two fish pattern is common and unglazed fish can also be found.

Dating evidence

Class LQC III can be dated to the middle of the Yuan dynasty based on the dating evidence described below. The Ren Shi tomb found in Shanghai yielded a vase with a applied floral design and this tomb can be dated to between the fourth year of the Zhi Yuan Reign to the thirteenth year of the Zhi Zheng Reign (至元四年-至正十三, 1338-1353 AD) (SHBWG 1982:53). A vase found in Yicheng City of Hubei Province has absolutely dating evidence as the inscription reads 'December of the fifth year of Zhi Zheng Reign' (至正伍年十二月了, dated to 1345 AD) (Zhang 1996). Celadon plates have been found in a shipwreck in Cixian City of Hebei Province, and the ship can be dated to 1352 AD (Kim 2012). A tomb dated to 1353 AD found at Zhangshu City of Jiangxi Province yielded a vase (Huang 1996) and a set of celadon wares was found in a cellar in Gao'an County of Jiangxi Province. No datable inscriptions have been found, but based on other findings this cellar can be dated to between th eleventh year to the twenty first year of the Zhi Zheng Reign (至正十一年－至正二十一年, 1351－1361 AD) (Liu and Xiong 1982). The remains of a city, named Jining Lu Ancient City, was found in Inner Mongolia in 2003 and this has been dated to between the eighteenth to twenty-eighth year of the Zhi Zheng Reign (至正十八年至至正二十八年, 1358-1368 AD). Large numbers of Longquan bowls, plates, dishes, stem cups, vases, incense burners and jars have been discovered (Wang 2004a).

Key identification points

The larger size is one of the most important features of class LQC III. Celadon wares of class LQC III have a relatively large size: a bowl typically has a 20 to 30cm mouth diameter, is 8 to 15cm high and has a base diameter of about 8cm, while plates have a mouth diameter of 30 to 40cm, are 5 to 8cm high and have a base diameter of about 10 to 20cm, although exceptions can be found.

Fully decorated and complicated decorations on wares are another important feature of class LQC III. Compared to class LQC II, carved, moulded and applied decorations are much more common on these wares and the pattern designs can be clearly seen through the thinner glaze.

Distribution

Altogether with LQC II (Longquan celadon dated to the later Southern Song Dynasty), the Longquan celadon wares were widely distributed in the western Indian Ocean and they make up a high percentage of all Chinese traded ceramics in the 14th century. This is based on Table 6.9 in Appendix 5, which shows 69.6% of the 14th century Chinese trade ceramics are Longquan celadon and, among 81 sites in the western Indian Ocean, 63 sites produce these finds. Particularly, the sites of Periyapattinam in India (Site 4), Nilaveli in Sri Lanka (Site 46), Minab area and Kish Island in Iran (Sites 52 and 97), Julfar and al-Nudud in UAE (Sites 69 and 126), Sharmah in Yemen (Site 94), Fustat and Aydhab in Egypt (Sites 101 and 127), Mombasa, Shanga and Gedi in Kenya (Sites 109, 110 and 111) all yielded a very large amount of Longquan celadon (from about 100 sherds to 2,394 at Fustat).

<u>10. LQC IV-1 (Imperial Type Longquan Celadon)</u>

(cf. ZJSWWKGYJS et al. 2009)

Body type: Stoneware/Porcelain **Origin: Zhejiang**

Drawing: see Appendix 6-Drawing 6: 1-3

Definition

Class LQC IV can be divided into the subclasses LQC IV-1 and LQC IV-2, which date to the early Ming dynasty (the late of 14th century to the early 15th century). LQC IV-1 is a group of high quality Longquan celadon, and includes imperial celadon products from the Dayao Fengdongyan kiln site that can be precisely dated to the Yongle period (1403-1424 AD).

Subclass LQC IV-1 can be only found in very small quantity because it is imperial or imperial type celadon. These celadon bowls, plates, vases and jars were imperial gifts from Emperor Yongle to other countries and taken on the voyages of Zheng (Qin & Liu, 2012).

Detailed description

Glaze and body

LQC IV-1 wares have a very thick glaze (1 to 2mm) in bean green or light green. The colour of the glaze has been very well controlled and only rarely is yellowish green, dark green and brownish green seen. The glaze quality is high and as good as jade, rarely are the crackles present. The body is heavy, pure and smooth with no visible inclusions, and is greyish white.

Shape and decoration

LQC IV-1 Celadon is the same size as class LQC III wares and even larger. The shapes of bowls and plates are carefully formed and well-wheel turned. Both the shape and decoration follow the imperial designs of the Ming court. According to the *Collected Statutes of the Ming Dynasty*, 'a statute stipulated in 1393 AD that: the manufacturing of tribute objects must be following the imperial designs and structures sent from the court (洪武二十六年定，凡烧造贡用器皿等物，须要定夺样制)' (Li Dongyang, Ming Dynasty).

Plates with a floral rim and a projecting rim, a big bowl with a straight rim, vases and ewers have all been found at the Dayao Fengdongyan imperial kiln site. Moulded dragon with five claws, scrolling floral designs and carved flowers, lotus petals, auspicious Buddhist signs, two fish, and a monochrome green glazed pattern are all-common.

Dating evidence

A kiln tool (mould) from the Dayao Fengdongyan imperial kiln site has a carved inscription dating from the ninth year of the Yongle Reign (1411 AD) and this is where high quality imperial Longquan celadon wares have been discovered (Xu, 2009: 11). No archaeological dating evidence for class LQC III is available from tomb sites or remains sites.

Further dating information of LQC III is based on the chronological shape and patterns compared to imperial blue and white ceramics (Figure 4.6; see subclass JDZBW II-1). The same shape and decorated blue and white porcelain plates have been found at the Jingdezhen kiln sites (景德镇窑址) as well as in tombs, which provides indirect dating information for LQC IV-1.

Figure 4.6: Comparison of imperial Longquan Celadon plate and imperial Jingdezhen blue and white porcelain plate.

(Celadon diameter: 445mm) (SDBWG 2012:120-121)

Key identification points

Subclass LQC IV-1 has a heavy and full glazed footring and inside the foot an unglazed ring can be seen. This unglazed ring started in the middle of the Yuan dynasty but is rare, whilst during the early Ming dynasty an unglazed ring is common. Imperial celadon has a well-made ring which is clear and neat and celadon wares of subclass LQC IV-1 all have a regular green glaze, such as bean green or light green.

Very rarely another green variation is seen.

Distribution

The imperial type of Longquan celadons have been confirmed at the sites of Hormuz Island (Sites 53) (Lin and Zhang 2015) and Gedi in Kenya (Site 111) (Liu et al. 2012).

11. LQC IV-2 (late Longquan celadon)

(cf. Zhu 1998, ZJSWWKGYJS 2005)

Body type: Stoneware/Porcelain **Origin: Zhejiang**

Drawing: see Appendix 6-Drawing 6: 4-7

Definition for LQC IV-2

In contrast to subclass LQC IV-1, LQC IV-2 wares are common or low quality Longquan celadon products from the early Ming dynasty. The dating range of this group may be longer than for subclass LQC IV-1 as it starts from the middle of the 14^{th} century and finishes in the middle of the 15^{th} century. After the voyages of Zheng He ended in 1433 AD, trade between China and the Gulf declined due to the ban on maritime activities issued by the Ming court (the *haijin* sea-ban policy). Also at this time, blue and white porcelain from Jingdezhen kilns (景德镇窑) became a strong rival to Longquan celadon. It is therefore rare to find Longquan celadon which dates to the period 1433-1444 AD and later. During the late Ming dynasty blue-and-white porcelain in the Karrak style started to dominate the Chinese ceramic export market in the Indian Ocean and Europe.

Detailed description

Glaze and body

Subclass LQC IV-2 has a glass-like, thin, green glaze. Normally the glaze has been applied three times and there is some variation in the green, such as dark green, brownish green, olive green and yellowish green. The body is loose compared to class LQC II and subclass LQC IV-1, and black inclusions can be seen by the naked eye. The body is white, very thick and heavy, normally thicker than 1 to 2cm. Wares with a pure, good quality and white body are also seen.

Shape and decoration

The main shapes are plates, bowls and large jars. New shapes, including flower-pots, big stem cups and so forth can also be seen but were rarely for export. Bowls and plates are large in size, very heavy and not well-formed. Bowls and plates have a slightly in-turned, heavy and thick footring. The top of the footring is round, and large plates and bowls have a thickened and lower top. Normally, the footring is trapezoid and fully glazed. Inside the footring is a wider, freely and irregularly unglazed ring (compared to subclass LQC IV-1) or the base is unglazed. The unglazed ring on the base of plates is noticeably wider than in LQC III and LQC IV-2 ware. Large jars have a fully glazed hole in the centre of the inner area of the footring.

For decoration, carved, moulded patterns similar to those of class LQC III wares are seen, together with new patterns and decoration methods. Hollowed patterns and seal moulded patterns are common, and patterns constructed from Chinese characters can be seen. Relief lotus petals are absent but the pattern of double line-carved lotus petals with a pointed top is common; applied decorations are rare.

Dating evidence

Subclass LQC IV-2 can be dated to the early to middle Ming dynasty (between 1387 and 1444 AD) based on tomb site excavations in China. Four tomb sites have been found in present-day Nanjing City in Jiangsu Province, which was the capital during the early period of the Ming dynasty (the Ming capital moved to Beijing after 1412 AD). The Xue Xian Tomb, which dates to 1387 AD based on an inscription from the tombstone, yielded a celadon bowl with a similar shape, body and glaze to the bowls in subclass LQC IV-2. The inscription reads 'Hong Wu Er Shi Nian (洪武二十年, the twentieth year of the Hong Wu Reign)' (NJSBWG 2005). The Zhang Yun Tomb yielded a set of Longquan celadon, consisting of bowls, cups and vases and a tombstone, which can be dated to 1395 AD based on the inscription 'Hong Wu Er Shi Ba Nian (洪武二十八年, the twenty-eighth year of the Hong Wu Reign)' (NJSBWG 2005). The Song Sheng tomb dates to 1407 AD based on the tombstone inscription 'Yong Le Wu Nian' (永乐五年, the fifth year of the Yongle Reign)' yielded a set of bowls, plates and flower-pots, which share the shapes of subclass LQC IV-2 wares (Li

1962). The Ye Shi tomb, whose owner is Song Sheng's wife, can be dated to 1418 AD based on the inscription 'Yong Le Shi Liu Nian (永乐十六年, the sixteenth year of the Yongle Reign)' yielded a set of celadon plates and vases (Li 1962). Latest dating evidence for subclass LQC IV-2 comes from two further tombs. The Ge Shi Tomb can be dated to 1441 AD based on the inscription ' Zheng Tong Liu Nian (正统六年, the sixth year of the Zhengtong Reign)' and yielded two vases, while the Wei Yuan Tomb, which dates to 1444 AD based on the inscription ' Zheng Tong Jiu Nian (正统九年, the ninth year of the Zhengtong Reign)' has produced a group of celadon plates and vases (Zhu 1998:272-284).

Key identification points

Subclass LQC IV-2 wares have a heavy and full glazed footring, and inside the foot an unglazed ring can be seen. However, both the footring and the unglazed ring are of lower quality compared to subclass LQC IV-1. The slightly inturned, heavy and trapezoid foot with a wide and irregular unglazed ring or unglazed base at the inside of the footring are key points for identifying LQC IV-2 wares.

<u>12-13. LQC III Type & LQC IV Type (Longquan celadon imitations, the sub-classes of LQC III and LQC IV)</u>

(cf. Yu 1995, Huang 2011)

Body type: Stoneware/Porcelain **Origin: Southern China**

Drawing: see Appendix 6-Drawing 7:

Definition

These subclasses are imitations of Longquan celadon. It is difficult to define this group because the original kilns producing these imitations cannot be precisely identified and information is lacking concerning such imitations. The current understanding of Longquan imitations is limited; however, it can be seen that they mainly come from present-day Fujian, Guangdong and Jiangxi Provinces in southern China. These neighbouring kilns all imitated Longquan celadon when Longquan celadon wares were highly popular and exported for Indian Ocean trade in the 13th to 14th centuries.

Imitated Longquan celadon can be divided into two groups: LQC III Type dates to the Yuan period, and LQC IV Type dates to the Ming era, with their shape and decoration closely following those that they are imitations, although their fabrics are different.

This class only presents the distinguishable features between Longquan wares and Longquan type wares. It should be noted that exceptions may be found, which can mistakenly lead to lower quality Longquan celadon sometimes being grouped with imitations. It should be noted that the current understanding of imitation Longquan wares is relatively poor.

Rough dating proofs and distinguishable features of LQC III Type and IV Type

Guangdong Longquan celadon

Guangdong Longquan celadon mainly comes from the Pearl River Delta, Dong Jiang River, Xi Jiang River, and the Chaoshan plain, all areas which are geographically positioned near port cities and convenient for transportation. This may indicate that this imitation Longquan celadon is mainly aimed for export. Potential Guangdong Longquan kilns are mainly located in Huizhou City (惠州市), Zhuhai City (珠海市) and Heyuan City (河源市) (Huang 2011:483-484).

The kilns located in Huizhou City are the only group of kiln sites that have been excavated where imitation Longquan celadon wares have been found. Two kiln sites, the Baimashan Kiln site (白马山窑址) and the Xinanzhen Kiln site (新庵镇窑址), were surveyed and excavated in the 1950s (Huang 2011:484). The Baimashan kiln produced a large number of celadon wares dated to the Ming period. This celadon has a relatively soft and porous body in greyish white, and is heavy. The glaze is normally yellowish green or greyish green, and in some cases the glaze is thin and crackled. The footring and base are normally unglazed. Wares are decorated with a lotus petal pattern, which is very thin and only carved. The tops of the petals are linked to a line near the rim making this pattern very different to Longquan celadon which has pointed tops on the lotus petals. At the centre of the inside surface there is normally a sealed or moulded design, consisting of an auspicious Chinese character, such as Fu

(福, luck), Shou (寿, long life), Ning (宁, peace) or Wan (卍, ten-thousand or *svástika*). All the wares are small in size, and the mouth diameters are normally 9cm to 15cm (Zeng 1962). The Xinanzhen kiln site produced a similar type of celadon wares, and this site has been roughly dated to the Yuan to Ming period (Zeng 1964c).

Jiangxi Longquan celadon

Definition and dating

Traditionally, it is believed that imitated Longquan wares produced in Jiangxi Province come from the Jingdezhen kilns, and production here dates to the middle Ming dynasty. However, dating based on seven tombs indicates that they are from 1189 to 1582 AD and thus this has extended the dating range, although some wares from earlier tombs dating from before the Yuan dynasty (1271 AD) cannot be confirmed as Jiangxi imitated Longquan (Yu 1995:272-273).

The imperial kilns from the Ming dynasty at Jingdezhen city yielded many sherds which have the celadon glaze, although these are regarded as bean green celadon (a term for monochrome green wares during the Ming dynasty) rather than celadon. However some of the sherds look like Longquan imitations (Xue 1965, Yu 1973, Yang 1981, Liu et al. 1982, Yu 2011:475-476).

Archaeological findings from the Linjiang kilns (临江窑) in Jiangxi Province, which were excavated in the 1990s, have provided some new information, and proved to be important kilns. The Linjiang kilns imitated Longquan celadon from the Yuan dynasty and stopped sometime during the Ming dynasty(BJSWWYJS 2007, Yu 2011).

Therefore, in general, Jiangxi imitated Longquan celadon wares consist of two main groups: Yuan period imitated Longquan s from the Linjiang kilns, and Ming period imitated Longquan from both the Linjiang and Jingdezhen kilns.

Body, glaze, shape and decorations

The two groups of imitation Longquan celadon wares are both lower quality than Longquan celadon *per se*. The stoneware body is greyish white, but greyer than Longquan celadon. The glaze is thick with small crackles but is greyish green, and therefore distinguishable from the bean green or olive green glaze of Longquan celadon. Small and deep glaze crawling is common on the imitations, but rare on

Longquan celadon. In comparison to Longquan celadon, imitated Longquan celadon from the Linjiang kilns has a thinner glaze and a thicker glaze, but this is difficult to precisely scale. Both the Yuan and Ming era imitations have a fully glazed top to the footring and the inside area of the footring has a narrow unglazed ring. In comparison, Longquan celadon has a wider unglazed ring, which dates to the Ming period (Yu 1995).

The shape of Yuan group imitated celadon is generally similar to that of Longquan celadon, but the bowls have a deeper body and sometimes a rolled rim. Small dishes normally have a pointed body, which is rare in Longquan celadon during the Yuan dynasty. Imitation bowls in the Ming group are similar to Ming Longquan celadon, and have a deep body and a straight rim, but normally have a high footring. Plates have a flattened and floral rim with a wide body, which is different to Ming Longquan produced celadon. In some cases, wares both these groups (plates and bowls) have a bulging base (the centre of the inside area of the footring bulges). On the inside surface an unglazed rim maybe found in the centre, which is in order to save kiln space, and is indicative that these wares are of lower quality. This type of unglazed rim on inside surface is rare in Longquan celadon wares.

Many decorative patterns on the imitated wares are similar to original Longquan wares, for example, a lotus petal small dish with two applied fish on the inside surface is very commonly produced by both kilns. However, imitated Longquan during the Yuan dynasty has some distinguishing patterns: single or triple lines, which are uncommon on Longquan celadon wares which have a carved pattern.

During the Ming dynasty, Jiangxi imitated Longquan was called bean green celadon, and was sometimes marked with cobalt blue. Wares were glazed with both celadon and white; the wares were glazed with green but the base in white glaze (Yu 2011:478-480).

4.4.2 Qingbai ware complex

Southern China did not produce white glazed stoneware until the 10^{th} to 11^{th}

centuries. Based on the popularity of white stoneware from northern kilns and improvements to celadon ware in the south, a type of wares with a glaze that was in between celadon green and white was produced. This glaze is bluish green and therefore the products are called Qingbai wares (QBW).

The original site of production place and earliest dating of Qingbai ware is the subject of debate. It has been argued that Qingbai wares are a type of imitation of northern Chinese white stoneware, which was first made in the Jingdezhen kilns in the 10th century (Li 1998:146). Due to the popularity of northern white stonewares, southern Chinese kilns started to imitate white stonewares, but it is difficult imitate the true white porcelain-like stoneware produced in the Xing and Ding kilns (see classes XINGW & DINGW). Alternatively, Qingbai wares are thought not to be imitated white stonewares because kilns such as the Jingdezhen kilns, Ganzhou (赣州窑) kilns and Jizhou kilns (吉州窑) in Jiangxi Province, Fanchang kilns (繁昌窑) in Anhui Province, and Qingshan kilns (青山窑) in Hubei Province, could make white stoneware, including low quality stoneware with a white slip, earlier than Qingbai celadon was produced. The Qingbai wares were therefore an improved white stoneware produced in southern China (Huang 2006b:84-87).

It is not necessary to discuss the original and first firing of Qingbai wares in this thesis, although it can be seen that Qingbai wares were becoming popular and matured in the 10th century. Based on archaeological finds and remains from the kiln site excavation at Kejiachong area of Fanchang County, it has been confirmed that the first firing of Qingbai wares is no later than the Five Dynasties period (Yang et al. 2006:47-48). According to other kiln sites in Jiangxi, Anhui, Hunan, Hubei and Sichuan Provinces, the maturation of Qingbai ware firing occurred during the 10th century (Liu 1981a, Huang 2006b:87). Among these kilns, Qingbai wares from Jingdezhen kiln are regarded as the most representative products (Liu 1981a:16). Local kilns in Fujian and Guangdong Provinces largely imitated Jingdezhen Qingbai wares during the following three centuries.

A large quantity of early Qingbai wares were recovered from the Intan shipwreck which dates from the 10th century (918-985 AD). These Qingbai wares all come from the Jingdezhen kilns, or at least local kilns in the Jingdezhen region (Flecker 2002:115). A covered box was unearthed from this shipwreck and similar boxes have been found in the Hutian Kilns (湖田窑) in Jingdezhen city. This suggests that Qingbai wares were exported from the Five Dynasties period to the early Northern Song dynasty. During the next three centuries manufacturing expanded into Fujian and Guangdong. The Sharmah site in Yemen has yielded a large number of Qingbai wares dating from the Northern Song Dynasty to the Yuan Dynasty. These Qingbai wares mainly come from Jiangxi, Fujian and Guangdong Provinces (Zhao 2006). Similar finds have been recovered from the Java Sea shipwreck which dates to the 13th century (Mathers and Flecker 1997:77-94, 182) and finds from the Gulf, based on the Williamson Collections following an examination by the author (Priestman 2005). This change indicates that the Fujian and Guangdong local kilns largely imitated Qingbai wares from the Jingdezhen kilns. In general, it can be seen that Qingbai stoneware/porcelain had a very complicated firing distribution in China and their imitations were widely produced in Fujian and Guangdong.

In this section, there are six sub-classes which fall into two general groups: JDZQB (Jingdezhen Qingbai wares) and QB Type wares (Qingbai type wares). Class JDZQB indicates that the Qingbai wares were produced in the Jingdezhen kilns and have the most ceramic features among Qingbai wares, and are regarded as higher quality ceramics. 'QB Type' represents other greyish white glazed or bluish white glazed wares, mainly produced in the kilns located in Fujian and Guangdong. Other possible kiln sites, such as those located in Anhui and Hubei, will also be included in the QB Type subclass.

Some white glazed stonewares of the subclass QB Type are very similar to the coarse white stonewares produced in the 10th to 13th century. In many cases it is very difficult to distinguish between them; therefore it should be noted that this class is strongly linked to the CW II class.

The JDZQB class has three subclasses: JDZQB I dates from the Five Dynasties to the Northern Song period (about the 10th to 12th century); JDZQB II dates to the Southern Song Dynasty (about the 13th to 14th century); and JDZQB III dates to the

Yuan dynasty and has two sub-groups. JDZQB III-1 represents traditional Qingbai stoneware/porcelain, while JDZQB III-2 (the class name is JDZSF) is bluish white and milky glazed porcelain, which is called Shufu wares (枢府瓷). The dating of QBW I Types closely follows the development of the JDZQB class, and also has two subclasses: QBW I Type roughly dates to the Song period (960-1271 AD) and QBW II Type dates to the Yuan Dynasty.

14. JDZQB I (Jingdezhen Qingbai porcelain dated to Northern Song Dynasty)

(cf. Liu and Bai 1980, Pei 1999b, Guo 2006, JXSWWKGYJS and JDZMYBWG 2007)

Body type: Stoneware/Porcelain **Origin: Jiangxi**

Drawing: see Appendix 6-Drawing 8: 1-16

Definitions

Class JDZQB I covers the period from the 10^{th} to the 12^{th} centuries (the Northern Song dynasty). Qingbai stoneware/porcelain is mainly from the Hutian kilns, which are a representative group of kilns firing Qingbai celadon in Jingdezhen. The Shengmeiting kiln (胜梅亭窑), Xianghu kiln (湘湖窑), Nanshijie kiln (南市街窑), Huangnitou kiln (黄泥头窑) and Liaojiawan kiln (柳家湾窑) also produced Qingbai wares at this time (Feng 2009:403).

All of these kilns can be called the Jingdezhen kilns but the current understanding of these kilns except for the Hutian kilns is weak. Therefore, this class is mainly based on the excavation at the Hutian kilns.

No archaeological evidence of Qingbai stoneware/porcelain has been found before 960 AD in the Hutian kilns (and other kilns in Jingdezhen), and the era from 960 to 1127 AD can be divided into two sub-eras: 960 to 1064 AD when there was growth in Qingbai stoneware/porcelain production in Jingdezhen, and wares are relatively thick, heavy and of lower quality, and the period from 1064 to 1127 AD, which was the heyday for Qingbai stoneware/porcelain production at the Hutian kilns.

Detailed description

During the early era of class JDZQB I dating from 960 to 1064 AD, Qingbai stoneware/porcelain in some cases has a lower quality body fabric in light yellowish grey, which it is not very hard, relatively coarse, thick and heavy. The glaze is thin and transparent, sometimes it is semi-transparent but not milky, in light yellowish white or light greenish white. The spinning mark on the body can be seen through the thin glaze.

The shape is relatively heavy and low. The body is deep and the footring is not very high but is thick. Covered boxes are high and thick in comparison to boxes from the later period. Normally a box is multi-lobed in the shape of a melon, and the knob on the top of the lid is shaped like a melon seedling. Decorations are rarely seen on bowls and plates, especially on the inside surface. In some cases the outside surface is decorated with carved lines in the shape of chrysanthemum petals, and these are simple and stylised (JXSWWKGYJS and JDZMYBWG 2007:449-450, 464-465).

During the late JDZQB I period, dating from 1064 to 1127 AD, Qingbai stoneware/porcelain matures, and has a good quality stoneware body in white or light greyish white, although a yellowish white body can be seen in some examples The body is much thinner and harder and may be translucent, such that light can be seen through the wall of bowls or plates. The glaze is thicker and is greenish white or bluish white; the glaze sometimes runs down to the base, where the glaze is thick.

The shape is higher and thinner, and bodies with different shape, such as a deep body, straight body or a conical body are seen. The footring is much higher and thinner. A small cake-shaped separator is placed at the inside area of the footring and therefore the top of the footring is full glazed. The shape of boxes remains high but the decoration is simpler. Decorations on plates and bowls are in varied patterns, mainly carved. Moulded patterns can be seen on reverse fired wares with an unglazed rim, which is a new firing technique for the Hutian kilns which was introduced from the Ding kilns (定窑) in the north of China. However, at this time this technique is not common. Bowls or plates with a petal rim can be seen and decorative patterns mainly consist of flowers (chrysanthemum, lotus, peony or other stylised flowers), petals (lotus petals or common petals), birds (normally grouped by three birds), sea waves and floral scrolls.

Dating evidence

Over 80 tombs in China have yielded Jingdezhen Qingbai wares, dating from 986 to 1127 AD, and almost all the dating evidence comes from tombstones. Only three absolute dating proofs have been found carved on objects, such as a ceramic figure, stationery and a piece of pottery, and these also indicate that the dating period of class JDZQB I ranges from 1057-1083 AD. No datable inscription has been found on Qingbai porcelain wares unearthed from these tombs. Therefore, the dating of this group is reliable and it can be seen that class JDZQB I can be dated to the 11th century, although it may start slightly earlier in the late 10th century (JXSWWKGYJS and JDZMYBWG 2007:548-550).

However, the chronological development of shape is not very clear because some typical early Qingbai stoneware is still being fired in the later era and the shapes do not noticeably change during the later period. Therefore, class JDZQB I is dated to the Northern Song period and there are no sub-classes as specific changes cannot be observed, the only change is in the fabrics.

15. JDZQB II (Jingdezhen Qingbai porcelain dated to Southern Song Dynasty)

(cf. Liu and Bai 1980, Pei 1999b, Guo 2006, JXSWWKGYJS and JDZMYBWG 2007)

Body type: Stoneware/Porcelain **Origin: Jiangxi**

Drawing: see Appendix 6-Drawing 8: 17-27

Definitions

Qingbai porcelain continued to be fired at the Hutian kilns in Jingdezhen city and other local kilns during the Southern Song dynasty (1127-1274 AD), but the scale and number of kilns was reduced (JXSWWKGYJS and JDZMYBWG 2007:467). The firing technique, shapes of wares, decorations and production quality all gradually changed in comparison to class JDZQB I. In general, class JDZQB II wares are of relatively lower quality than JDZQB I wares and the reverse firing technique is very common.

It appears that these changes did not immediately occur following the dynamic shift from the Northern Song to the Southern Song period. According to the findings from Sharmah, Kilwa, Manda and Shanga, Qingbai stoneware/porcelain dated to the 12th century have similar features. A similar situation also occurred at the Hutian kilns; therefore, class JDZQB II may have started in the 13th century but no specific time point can be clearly determined.

Detailed description

The body fabric of class JDZQB II wares has changed to be relatively soft and porous, and is light yellowish white. The glaze has become milky or translucent, and the colour shows variations of yellowish white, bluish white, light greyish white or light greenish white.

The shape became slightly smaller and shorter in comparison with class JDZQB I. The body shape of bowls and plates can be straight, deep and conical, and the footring is short, small and thin, and normally is fully glazed. The base is thinner and the rim is normally unglazed due to the reverse firing technique.

The decoration is mainly moulded, and the pattern motifs mainly consist of birds and ancient Chinese gardens and landscapes. The patterns are complicated and fully decorated on the inside surface of bowls or plates.

Dating evidence

About 50 tombs found in China support the dating of JDZQB II, and range from 1130 to 1224 AD (JXSWWKGYJS and JDZMYBWG 2007:550-552). Finds in the western Indian Ocean, Iran, Shanga, Kilwa, and Manda in East Africa, have all reported that class JDZBW II wares have been found in significant numbers. It appears that typical Qingbai plates and bowls with a semi-milky, bluish white glaze, an unglazed rim and moulded pattern decorations did not occur in Sharmah. However, JDZBW III wares (the next sub-class which dates to 1274 to 1368 AD) appears in Phase 5 which dates from about 1250 AD to the 14th century (Zhao 2006:100-101).

In the Williamson Collection, 83 Qinbai sherds have been dated to the 11th to 13th centuries (QING.1), and these are varied quality, from very fine to gloss, coarse and heavily crazed (Priestman 2005:293). Therefore, it can be seen that this wares in this group come from different kilns. According to the author's examinations, a large number of sherds from this group may date to the 12^{th} to 13^{th} centuries, and therefore belong to the JDZQB II class.

The peak of Qingbai stoneware importation into Shanga was reached during Phase 16, which dates to the middle and late 13^{th} century (Horton et al. 1996:146, 309). Sites at Kilwa, Madagascar and Fustat have also produced a number sherds classed as JDZBW II (Chittick and Wheeler 1974, Ma and Meng 1987:310-311).

16. JDZQB III (Jingdezhen Qingbai porcelain dated to Yuan Dynasty)

(cf. Liu and Bai 1980, Guo 2006, JXSWWKGYJS and JDZMYBWG 2007)

Body type: Stoneware/Porcelain **Origin: Jiangxi**

Drawing: see Appendix 6-Drawing 9: 1-16

Definitions

During the Yuan Dynasty (1274-1368 AD), following the creation of Shufu Qingbai porcelain, a new type of Qingbai ware with a porcelain body and a milky glaze (see sub-class JDZSF) and blue and white porcelain (see class JDZBW), the firing of Qingbai stoneware at the Hutian kilns in Jingdezhen City declined. Qingbai stoneware in this class is of lower quality in comparison to JDZQB II wares. The fabrics and shapes changed gradually but it can be seen that this change occurred during the 14^{th} century (JXSWWKGYJS and JDZMYBWG 2007:467).

The decline of Qingbai stoneware in Jingdezhen does not indicate that ceramic firing and the scales of the kilns in this area was reduced. New and rich types of Shufu porcelain, blue and white porcelain and black glazed stoneware all indicate that the Jingdezhen kilns experienced a period of development during the Yuan dynasty (JXSWWKGYJS and JDZMYBWG 2007:467).

Detailed description

Class JDZQB III wares have a coarse body, with two thicknesses observed: a thin body resulting from reverse firing, which has an unglazed rim; and a thick body found in bowls and plates, which has a flat base. All bodies are light greyish white or light yellowish white. The glaze is thin, milky or translucent, and normally is yellowish white with a light greyish blue, sometimes small crazing can be seen. For the bowls and plates with a flat base, the glaze is thicker and is greyish white.

Bowls and plates are very common, whilst stem cups, covered boxes and small jars can also be seen. Some new shapes of bowls are also found. As mentioned above, wares with a flat base are a new shape, which only occurs during the Yuan dynasty. The base is fully unglazed and the area where the body is exposed is commonly stained red. Sometimes with this shape an unglazed ring can be seen on the centre of the inside surface. In addition, bowls with a pointed body are also a new shape, and again only occur during this period (Liu and Bai 1980). Similar to class JDZQB II, an unglazed rim and reverse fired wares are very common during this period. Unfired bowls and plates are normally badly treated, such that the footring is quickly formed and of low quality, which the base centre normally having a pointed and small knob.
Moulded patterns are a very popular decoration, which motifs consisting of double-fish, double-birds, lotus, lotus petals, peonies, chrysanthemums and squared spirals all common. Due to the milky glaze and coarse body, the moulded patterns are not clear. Knife-carved patterns can be also seen, where the motifs are double-fish, lotus and lotus petals (JXSWWKGYJS and JDZMYBWG 2007: 459-460; 467).

Dating evidence

About 10 tombs in China suggest a dating range for class JDZQB II from 1283 to 1348 AD (JXSWWKGYJS and JDZMYBWG 2007:553-554). However, according to archaeological findings from the Indian Ocean, it can be seen that this may be extended from about the middle of the 13th century to the 14th century.

The Williamson Collection has a number of sherds from class JDZBW III, which come from the QING.1 group (Priestman 2005:293). The flat base and milky glazed Qingbai stoneware suggests that they could be from the 13th century. In Sharmah in Yemen, the number of objects in this group sharply declined, and this small group dates to the late Southern Song dynasty sitting between the classes of JDZQB II and III; this may be due a decline of this site (Zhao 2006:101). In East Africa, class

JDZQB III wares were not imported in large numbers to Shanga, Kilwa and Manda, similarly in Fustat (Chittick and Wheeler 1974, Chittick 1984, Ma and Meng 1987, Horton et al. 1996). However, this does not indicate that the ceramic trade had declined in these areas. For Qingbai type trade, a higher quantity of Dehua Qingbai stoneware was imported (see subclass QBW II Type). It is known well that Qingbai stonewares were also produced in Hubei and Anhui Provinces of southern China (Yang et al. 2006, Xiong and He 1997). According to Zhao Bing's examination of Chinese ceramics found in Sharmah, Qingbai productions from these provinces were exported to the western Indian Ocean. However, as she notes, this identification work is not conclusive (Zhao 2006). Therefore, we still need to determine whether these two kilns can be listed in the QBW I Type class.

17. JDZSF (Jingdezhen Shufu Porcelain)

(cf. JXSWWKGYJS and JDZMYBWG 2007)

Body type: Porcelain **Origin: Jiangxi**

Drawing: see Appendix 6-Drawing 9: 17-22

Definitions

Class JDZSF refers to Qingbai glazed (or Shufu glazed) porcelain, which is early porcelain due to the body not being sufficiently thin, white and transparent, and the glaze is milkier and whiter than that on normal Qingbai stoneware. It is called Shufu 枢府 (literally: central administration), which was an official name for a department of the Yuan central court. The milky and bluish white glazed porcelain wares with a Shufu mark refer to typical Shufu porcelain (Jian 1998:60). Porcelain with a similar body and glaze fabric but without the Shufu mark may also can be called Shufu wares, although a better name is eggshell white porcelain (卵白瓷). However, in many archaeological and historical studies, both Shufu porcelain and eggshell white porcelain both called 'Shufu porcelain' or 'Shufu-type porcelain' (Miksic 2004, Feng 2009:449). Therefore, in this section, this class has been labelled JDZSF (Jingdezhen Shufu Porcelain).

Both JDZQB III and JDZSF wares were fired in Jingdezhen City during the Yuan dynasty, but Shufu porcelain was a new creation of this period. It is of higher quality due to the decorations, body fabric and glaze quality, in comparison to Qingbai stoneware (Jian 1998:60, JXSWWKGYJS and JDZMYBWG 2007:310). It can be viewed as a form of high quality porcelain product which has only rarely been found in the western Indian Ocean. It has been recorded that the Fonthill vase with Shufu glaze was a gift from the Yuan central court to Louis the Great of Hungary (1324-1382 AD). This vase is now housed in the Irish National Museum in Dublin and is the earliest recorded piece of Chinese porcelain in Europe (Arnold 1999). Therefore, it can be seen that Shufu porcelain can be regarded as a very high quality porcelain product.

Detailed description

JDZSF wares have a porcelain body, which is not white, but is dense and as transparent as fine porcelain. The body is normally thick and hard, and slightly greyish white. Small and rare pores can be seen with the naked eye, but the body fabric looks pure. It has been defined as porcelain because both China stone and China clay have been utilised. It has a very similar body fabric to Jingdezhen blue and white porcelain dating to the Yuan dynasty (see JDZBW I).

The glaze of JDZSF wares is normally thicker than Qingbai wares, and is milky and normally white, greyish white or very light bluish white; the thicker the glaze, the bluer the colour. Small crazing can sometimes be seen, and for bowls and plates with a flat base, the glaze is thicker and greyish white. Large crazes can be seen but are rare.

In term of shapes, bowls, plates, stem cups and vases are common. A new shape during the Yuan Dynasty, is a pointed body, which normally occurs on bowls (Liu and Bai 1980). The size of Shufu wares is normally heavy. For decoration, moulded patterns were very popular, with motifs consisting of lotus, lotus petals, peonies, chrysanthemums and decorative lotus petals being common, together with dragons, phoenixes and flying birds. On the side surface on the walls of bowls, sometimes the moulded characters 枢府 (Shufu) can be seen but they are not clear. This is mainly due to the milky glaze which renders all moulded patterns unclear. Knife-carved and applied patterns can also be seen (JXSWWKGYJS and JDZMYBWG 2007:461; 467-468)

Dating evidence

Shufu wares can be clearly dated to the Yuan dynasty. The chronological shapes (e.g. bowls with a pointed body) and patterns (e.g. the separate decorative lotus patterns) suggest that Shufu wares featured in Yuan ceramic productions. Moreover, the tomb of Zhang Honggang located in Beijing yielded a very fine quality incense burner with a milky and bluish white glaze. This burner has been identified as a piece of Shufu porcelain and the tomb of Zhang Honggang is conclusively dated to 1305 AD by the tombstone (BJSWWYJS 1986:108-109, 112-113). There is no further archaeological dating evidence supporting Shufu porcelain as Shufu wares are very rare. However, no Shufu wares have ever been found in tombs dating from before the Yuan dynasty; therefore, dating Shufu porcelain to the Yuan Dynasty is reliable.

Distribution

The distribution of Shufu porcelain in the western Indian Ocean area is very rare. This is due to the definition for Shufu porcelain being unclear for many archaeologists and it being very easy to confuse finds with Qingbai stoneware. Currently, only in the sites of Pandalayini, Indian (Site 17), Polonnaruwa, Sri Lanka (Site 40), Kawd am-Saila, Yemen (Site 99) and Kilwa, Tanzania (Site 108) have reported the occurrence of Shufu (or Shufu type) ceramics (Table 6.9 in Appendix 5).

18. QBW I Type (Other Qingbai type wares dated to Song Dynasty, the sub-class of JDZQB I)

(cf. DHGCYKGFJGZD 1979, Huang and Yang 1983, Yang et al. 2006)

Body type: Stoneware/Porcelain **Origin: Southern China**

Drawing: see Appendix 6-Drawing 10: 1-8

Definitions

Subclass QBW I Type is a group of Qingbai stoneware similar to Jingdezhen Qingbai stoneware. However, it is of a different quality, body fabric and glaze, which places it between the typical stonewares of classes JDZQB I and II, and even the coarse white stoneware II (see class CW II). Normally, wares of this subclass are easily confused with these other classes, as there are no clear archaeological descriptions and definitions of this type. The archaeological understanding of these wares is weak; therefore, it is extremely hard for ceramicists and archaeologists to identify and date them.

In this section only possible kilns of QBW I Type wares are listed (Table 4.5). These kilns have been noted by archaeologists working in the western Indian Ocean and are mainly located in Guangdong, Fujian and Anhui Provinces (Heng 2005, Zhao 2006)(Wang Jianbao 2014: Personal Communication; Li Jian'an 2012: Personal Communication). However, the archaeological findings do not perfectly fit the list of possible original kilns and may have come from other neighbouring kilns not listed or from as yet unstudied kilns.

Dating can only be approximated to the Song dynasty (960-1274 AD) according to the existence of Qingbai wares in China. The archaeological features of these wares, such as shape, setting methods in the kiln and decoration, doubtless closely followed the development of Jingdezhen Qingbai stonewares. However, when dealing with very small sherds, they cannot be perfectly dated and identified based on the glaze and body fabrics. It should be noted that even decisions concerning the original manufacturing kilns and classes following close examination by the naked eye may not be very reliable (Zhao Bing, 2011: Personal Communication).

Qingbai stonewares were widely produced in Guangdong and Fujian Provinces in southern China from about the late 10^{th} to the 13^{th} century. Following a number of excavations and studies of kiln sites in Guangdong Province since the 1960s, over 300 individual kiln sites have been identified but only a limited number of kilns have actually been excavated. However, it can be confirmed that four main areas, consisting of the Chaozhou area, Guangzhou area, Nanhai area and Foshan area, produced traded Qingbai type stonewares in different quantities. Each area has a number of local kilns, except for the Chaozhou area, where all the listed kilns are near to Guangzhou city, which was an important port city in Guangdong Province. During the northern Song dynasty Qingbai type stoneware was the second largest ceramic product made in Guangdong. Local Chaozhou kilns, for example the Chao'an kilns (潮安窑), were key producers of Qingbai. According to excavations at the Chao'an kiln site, about 43.15% of the total unearthed sherds are Qingbai (FPSM 1985:63-67). The Xicun kilns located in Guangzhou, the Toushan kilns (头山窑) at Huizhou city, and the Shiwan kilns (石湾窑) located in the Foshan City (佛山市) have yielded a very limited number of Qingbai products (FPSM 1985:67).

In Fujian Province it appears that the development of the ceramic industry was later than at the local kilns in Guangdong, although archaeological evidence supports a number of early kiln sites dating to the Tang dynasty located in the Fujian region (cf. DHGCYKGFJGZD 1979).

Table 4.5: List of possible producers for QBW I Type wares.

Location	Kiln's Names	Reference
Guangdong	Chaozhou /Chao'an kilns	(cf. Huang and Yang 1983)
Guangdong	Shiwan kilns	(cf. Chen 1978)
Guangdong	Xicun kilns	(cf. GZSWWGLWYH and AMOCUH 1987)
Guangdong	Nanhai kilns	(cf. GDSWWH 1959, Song 1991)
Fujian	Zhangpu kilns	(cf. FJSBWG 1987)
Fujian	Nan'an kilns	(cf. Huang 1957)
Fujian	Anxi kilns	(cf. AXXWHG 1977)
Fujian	Tong'an kilns	(cf. Li 1974)
Fujian	Cizao kilns	(cf. Chen et al. 1982)
Fujian	Dehua Kilns	(cf. FJSBWG 2000a)
Anhui	Fanchang kilns	(cf. Yang et al. 2006)
Hubei	Husi kilns	(cf. WHSWWC 1984)

The establishment of a Mercantile Shipping Superintendent in 1087 AD drove the ceramic industry in the southern Fujian area, and during the Southern Song dynasty (after 1127 AD), the local kilns in Guangdong declined whilst the ceramic kilns in Fujian expanded (Ho 2001:258).

During the Song dynasty the Zhangzhou area and Quanzhou area were two key districts for the production of Qingbai ceramics. The Zhangpu kilns, located in the Zhangzhou area in the southwest of Fujian, are neighbouring kilns to the Chao’an kilns of Guangdong, and they borrowed the Qingbai ceramic technology and styles from the Chao’an kilns. Although the local kilns of Zhangpu were continually firing ceramic wares until the Yuan dynasty (Ho 2001:258, Huang 2005), the ceramic centre of Fujian shifted to the Quangzhou area, when Quanzhou became an international port in the late 11th century (Ye 2005j).

The fast development of the ceramic industry in the Quangzhou area was mainly due to Quanzhou port, which provided easy access for the transport of ceramics via river routes from the local kilns, such as the Nan’an kilns, Anxi kilns, Tong’an kilns Cizao kilns (磁灶窑) and Dehua kilns. Subsequently, a maritime trade boom from Quanzhou port with local kilns producing Qingbai type stoneware occurred in 12th to 13th centuries. The ceramic production mainly supplied the export market rather than local consumers (Ho 2001:262-263).

It is well known that Qingbai stoneware were also produced in Hubei and Anhui Provinces of southern China (Xiong and He 1997, Yang et al. 2006). According to Zhao Bing’s examination of Chinese ceramics found in Sharmah, Qingbai products had been exported to the western Indian Ocean. However, as she notes, this identification cannot be confirmed (Zhao 2006); therefore, it still needs to be determined whether these two kilns can be listed as producers of QBW I Type wares

Distinguishing features of QBW I Type

To define these ‘lower quality’ wares, the following points should be examined:

The body is not as hard as Jingdezhen Qingbai stoneware, and is rough. Areas where the body is exposed (without a glaze covering) is sometimes stained by red iron oxide from the body or kiln ash.

The glaze is thinner in comparison to Jingdezhen Qingbai wares. However, the glaze is normally hard and in many cases is greyish white or white, rather than bluish white (Wang Jianbao 2014: personal communication). This is mainly due to the un-balanced temperature and atmosphere of the kiln. Sometimes the lower part of the outside surface of bowls is unglazed. The glazes are similar to the white stoneware produced in the local kilns in Fujiang and Guangdong.

The surface and footring treatment is quick and free, in comparison to Jingdezhen Qingbai wares. The spinning lines on the wall of bowls and plates can be seen and the footring is sometimes unevenly glazed. Decorations are free and normally have been quickly carved. Floral patterns are common, and are stylized and simple. Reversed setting methods were introduced into Fujian Province during the Southern Song dynasty. It has been suggested by Wang Jianbao (2014: personal communication) that unglazed rims can be seen on many lower quality Qingbai wares produced in local kilns in Fujian. These can be distinguished from the Jingdezhen unglazed rims by the feature of the outside-unglazed part of the rim being wider than the inside.

19. QBW III Type (Dehua Qingbai Stoneware dated to Yuan Dynasty, the sub-class of JDZQB III)

(cf. DHGCYKGFJGZD 1979, Lin and Zhang 1992, Ye 2005a)

Body type: Stoneware/Porcelain **Origin: Southern China**

Drawing: see Appendix 6-Drawing 10: 9-21

Definition and possible kiln distribution

Qingbai porcelain was produced in the Dehua kilns located in Fujian Province, and can be seen as the most represented Qingbai type dating to the Yuan dynasty. It is believed that Dehua Qingbai stoneware is not an imitation of Jingdezhen Qingbai ware and it is also known as Marco Polo Ware (Raphael 1932, Chittick and Wheeler 1974:311). The Marco Polo Jar, housed in the Treasury of St. Marco in Venice, is about 12 cm high with a maximum diameter of 8.1cm, and has a low foot-ring and a short neck with four small loop-shaped lugs. It has a hard, white and thin body that is coated with Qingbai cream glaze. There are four zones of decoration in relief on the jar, which consisted of two bands of floral scrolls in the middle and bands of petal-like motifs near the top and bottom (Figure 4.7). Similar shaped Qingbai stoneware/porcelain finds have been widely found in many local kilns in Fujian province (DHGCYKGFJGZD 1979, Ke and Chen 1995, Ye 2005g). However, according to some contemporary studies of the Chinese Qingbai ceramics, there is no mention of the term 'Marco Polo Jar' (cf. Lin and Zhang 1992, Huang 2010).

Archaeologically, some fragments in the style of the Marco Polo Jar have been tentatively identified from many archaeological sites in the western Indian Ocean (see the columns QB: KN 105 and FJ in Table 6.9 in Appendix 5). They have been therefore named 'Marco Polo ware', and this has become one of the more confusing issues amongst Chinese ceramic objects that were imported to the Medieval Indian Ocean and Europe (Whitehouse 1972a:71-72), because these findings are ambiguously defined, dated and described. Indeed the concept of 'Marco Polo ware' confused archaeologists in many instances, including Morgan (1991:71), Horton (1996:310), Flecker (Flecker 2003:397-98) and Kennet (2004:63) who believe that this ware was made in the Dehua and Putian kilns or Anxi kilns in Fujian province of south China, but their evidence is based on the examples published by Hughes-Stanton and Kerr (1980:no. 186). This is because no further studies of the Marco Polo ware have been carried out yet.

Figure 4.7: The Marco Polo Jar housed in the Treasury of St. Marco in Venice.

(Height: 120mm) (Photography by Lin Meicun)

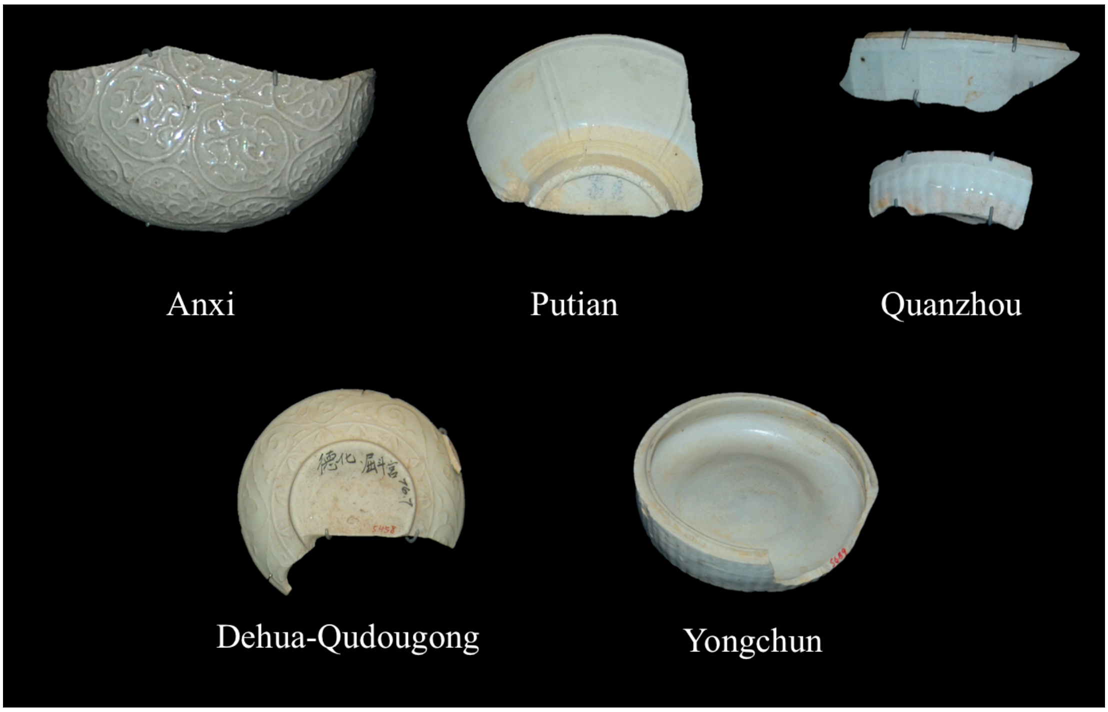


Figure 4.8: Yuan Qingbai sherds (QBW III) produced in Fujian local kilns (the Palace Museum).
(Photography by Wu Ning, created by Ran Zhang)

With the collected kiln sites of this thesis, it seems that Marco Polo ware had been widely produced in south Fujian Province and came from the kiln sites of, for example, the Yongchun (永春窑窑址) (Zeng 2001:173), Putian (Li 1979a, Ke and Chen 1995:612), Qudougong (屈斗宫窑址) (DHGCYKGFJGZD 1979, FJSBWG 1990a), Anxi and Quanzhou (泉州窑址) (Li 1960, AXXWHG 1977, Zhang 1989b, Lin 1999) (Figure 4.8). These sites seem all share the same style and firing techniques as Qingbai wares and are dated to the Yuan dynasty (about the 14th century, see below for more discussion of the dating evidence).

Dating evdience

Archaeological evidence shows that there are two key kiln sites of the Dehua kilns which are the Wanpinglun kiln site and Qudougong kiln site (DHGCYKGFJGZD 1979, FJSBWG 1990a). The moulded reliefs on the Qudougong Qingbai stoneware products have been distinguished from the wares at Wanpinglun kiln site (Lin and Zhang 1992:564), and are very similar products to the one housed by the Treasury at St. Marco of Venice.

About the dating of the Dehua sites, it has been argued that the Qudougong kiln site is later than Wanpinglun and is dated to the late 13th century and mostly the 14th century AD (cf. Lin and Zhang 1992). The dating evidence of the Qudougong site is mainly based on: firstly, some ceramic head figures with Mongolian garments, which could suggest the north Chinese culture was imported to south China during the Yuan dynasty (DHGCYKGFJGZD 1979:57); secondly, some pieces of kiln furniture yielded by the Qudougong kiln sites have inscriptions in Phags-pa script (DHGCYKGFJGZD 1979:57), which was a new alphabet commanded by Kublai Khan in 1269 AD. Its implementation in south China should be after 1274 AD, when the Mongolian rulers conquered the whole of China. Otherwise, the kiln furniture fragments with Phags-pa script have also been found in the Laohudong kiln site in Hangzhou city (e.g. Wang 2004c:89, Figure 45) and the Longquan kiln sites in Zhejiang Province (Zhu 1989b:28), which can be dated to the Yuan dynasty.

Thirdly and more importantly, there are some saggers with a cyclical date of '*dingwei* (丁未)' unearthed in Qudougong site, which implied two possible years during the Yuan Mongol's reign that were 1307 AD and 1367 AD. These two possibilities are still an open debate for scholars (FJSBWG 1990a:140-142, Lin and Zhang 1992:565, Ho 2001:251). A recent argument comes from Ho Chuimei and she suggests that the later date is highly possibility (Ho 2001:251). Ho links some white stonewares also from Qudougong which occurred in association with Yuan blue and white porcelain in burials in the Philippines. Due to the fact that no mature blue and white porcelain was made before the early 14th century (around the 1330s) (ZGGSYXH 1982:339-342) and the production of white stoneware at Qudougong could have lasted to the late 14th century, she therefore argues that 1367 AD is the real date (Ho 2001:251).

However, another observation could actually go against Ho's argument and it more directly links to the Dehua Qingbai wares. In the Gulf, the distribution of Dehua Qingbai wares in the Minab area of south Iran has no association with the blue and white porcelain. On the contrary, many blue and white porcelain sherds have been discovered in Hormuz Island but there are no finds of the Dehua Qingbai wares there (cf. Morgan 1991, Priestman 2005). The Hormuz Kingdom re-settled in Hormuz

Island from Minab in 1325 AD (Aubin 1953:102, Piacentini 1992:171-73). It therefore seems that the absence of Dehua wares from Hormuz Island might argue against the later date of the '*dingwei*' saggers. A similar observation has been made at Fustat where Dehua Qingbai wares do not occur, but a large number of blue and white porcelains do (Yuba 2014, Ma and Meng 1987:4-5). It has also occurred in the Sinan shipwreck near Korea where the cargo contained some Dehua qingbai wares but an absence of mature blue and white porcelains, and can be dated to 1323 AD (Shen 2012:18, 212-213). Based on this evidence, the dating of the Dehua Qingbai wares of the Marco Polo type should be dated from the late 13th to early 14th centuries.

Detailed description

Dehua Qingbai stonewares have a sugary and relatively soft body in comparison to Jingdezhen Qingbai stonewares dated to the Yuan dynasty (see classes JDZQB III and JDZSF). This is mainly due to a lower firing temperature. Even pottery-like stoneware with a yellow body can be found. These are the badly-fired products, which have been placed in a lower position within the kilns, where the firing temperature is low (DHGCYKGFJGZD 1979:56). Normally, well-fired Dehua Qingbai stoneware should be white.

This class normally has a Qingbai glaze, which is thin, glassy and not very hard. The well fired colour is bluish white, but pure white, yellowish white and greyish white can be found. Some wares have crazing (DHGCYKGFJGZD 1979:55).

In terms of shapes, bowls, plates, bowls with a pointed body, covered boxes, kendi and jars are common. Their size is normally not very large and the mouth diameter of bowls and plates is no larger than 23 cm. Unglazed rims and flat-bases are common, and some tablewares are half glazed on the outside surface. According to archaeological findings from the Qudougong site, the Qingbai ceramic setting and firing techniques were not standardised. Therefore there are variations in the shapes (DHGCYKGFJGZD 1979:55-56).

In terms of decorations, moulded patterns are very common and mainly consist of lines, a band of a classic scroll, flowers (including decorative lotus petals, lotus, chrysanthemums, peonies and plums), clouds and phoenixes. On plain wares, carved decorations and applied patterns can also be found (DHGCYKGFJGZD 1979:57-58).

Distribution

The distribution of Dehua Qingbai stonewares can be found mainly in both the Persian Gulf and Eastern Africa. In the Gulf, the sites of Kush and K103 in the Minab area have reported this class of wares, and Kilwa has also yield the so-called Marco Polo wares (Chittick and Wheeler 1974:311, Morgan 1991:70-71, Kennet 2004:48-49, Priestman 2005:294-295). However, only limited reports of similar findings have been noted in Yemen. Al-Shihr has yielded so-called fine Dehua sherds, but at the site in Sharmah no Dehua Qingbai stoneware of this class has been reported (Hardy-Guilbert 2001:74, 2005, Zhao 2006:101). It appears that no Dehua Qingbai stonewares have been reported in Fustat either (Ma and Meng 1987:4-5, Yuba 2014).

4.4.3 White stoneware/porcelain complex

The export of white stonewares/porcelain wares from China to the western Indian Ocean has a long history. Confirmed by both shipwreck and port-site archaeological evidence, this is one of the most important ceramic commodities and was traded from the 8th century onwards, making it one of the earliest Chinese trade ceramics (Tampoe 1989, Krahl et al. 2010). White stoneware manufacturing in China reached its peak during the period from the 7th to 8th centuries (Yang and Lin 1981, Zhang and Wang 1997), and it is well described by historical documents that white stoneware was widely produced and traded in China (Xiong 2006b:6). With some high quality white ceramics regarded as ideal tea wares (Lu 1927:Chapter IV) and luxuries for Chinese central palaces (Quan 1999b).

Chinese white stonewares account for a certain portion, but are much lower than the contribution of celadon wares and blue-and-white porcelains (see Chapter 3 and Table 6.7 in Appendix 5). This is probably because true white stoneware/porcelain (excluding Qingbai wares) was mainly produced in northern China before the 15th century (Li 1998), therefore their transportation for export through southern Chinese ports was difficult, and when Song China lost northern China, rare northern Chinese ceramics were available in the southern Chinese market and for maritime trade. In addition, during the 9th and 10th centuries, attempts to imitate white stonewares never ceased in southern Chinese kilns, such as the Jingdezhen kilns in Jiangxi, Fanchang kilns in Anhui and local kilns in Fujian. However, based on the obstacles of clay resources and manufacturing techniques, true white porcelain could not be fired in southern China until approximately the late 14th to 15th centuries (Li 1998:348-349). Hence badly imitated white, greyish white, and/or bluish white stonewares were widely produced in southern China and exported to external Chinese markets. Such imitation white stonewares cannot be attributed to the white stoneware classes.

Based on these points, this section aims to introduce white stoneware/porcelain ceramics, which can be divided into three large groups: northern Chinese white stonewares, southern Chinese white stoneware/porcelains, and low quality white stonewares. Coarse white stonewares can be found from both north and south China, which were attempts to imitate high quality white stonewares, such as Xing white stoneware/porcelain and Ding white stoneware. It is difficult to distinguish low quality white stonewares made by many southern Chinese kilns from Qingbai stonewares (see Qingbai Complex: QBW I Type and QBW II Type). Especially for plain white stonewares, the definition and distinguishable features between these two groups is not clear, and this remains a key limitation for this classification.

This section has eight classes: northern Chinese white stonewares, including XINGW (Xing white stonewares), DINGW I (early Ding white stonewares, imitations of Xing white stonewares), DINGW II (Ding white stonewares), CW I (early coarse white stonewares) and CW II (coarse white stonewares made in north China); and southern Chinese white stoneware/porcelains, including JDZW (Jingdezhen white porcelains), DHW (Dehua white stonewares/porcelain) and CW III (coarse white stonewares made in south China).

One point still needs to be noted, which is that low quality ceramic wares produced in China have been less well studied. These so-called coarse ceramics refer to low fired stoneware and high-fired pottery, which have a rough, porous and grey body, with visible tiny black inclusions. The term 'coarse ceramics' covers a large range of ceramic products that are defined by glaze types, and many have been mentioned in other classes, including lower quality celadon, Qingbai stoneware, porcelain and transport jars (see all the imitation type classes for celadon, blue and white and polychrome complexes; the transport jars complex is also a form of coarse ceramics) (Heng 2005:58-81). In comparison to white stonewares, these classes can be easily distinguished and grouped separately from their parallel high quality ceramic classes. These low quality white stonewares have a strong relationship with the Qingbai type classes, especially the wares produced in the local kilns of southern Chinese (Fujian and Guangdong Provinces). They may share similar colours, body and glaze fabrics, and in many cases cannot be easily distinguished and identified by current Chinese ceramic studies (Zhao 2011:Personal Communication, Wang 2014b:Personal Communication).

20. XINGW (White Stoneware of Xing Kilns)

(cf. Jia and Jia 1987, Zhao and Zhang 2007)

Body type: Stoneware/Porcelain **Origin: Hebei**

Drawing: see Appendix 6-Drawing 11: 1-4

Definition:

Xing white wares are high-fired porcelain-like white stoneware, which peaked during the 6th to 10th centuries (Li 1998:167). The Xing kilns are located in the present-day area of Neiqiu City, Lincheng City and Xingtai City in Hebei Province. Xing white wares as a type of ceramic goods were common during the Tang dynasty and were regarded as the most popular tablewares according to descriptions by Tang historians (Li 1987).

Detailed description

Glaze and body

High-fired Xing white wares have a pure white, semi-transparent, evenly applied, thin glaze. Some white wares have also had a white slip coat applied and then wares with a grey body look white. Slip coated white wares are regarded as low quality white wares and are low fired stonewares (around 1150°C) (Li 1998:167).

Xing white wares have a high-fired, porcelain-like, pure white and dense body. No inclusions can be seen using the naked eyes. It is believed that Kaolin clay was originally from Jingdezhen city and it was first used by Jingdezhen potters in the 13th to 14th centuries. However, according to scientific tests on sherds of Xing white wares, Kaolin clay had been used in the Xing kilns during the Sui-Tang era (approximately from the 7th to 10th century) (Li 1998:160). Xing kiln clay has a high percentage of aluminium oxide (Al_2O_3, higher than 25% to 27%) and a low percentage of iron oxide (Fe_2O_3, lower than approximately 1%), which allows high-fired Xing white wares to have a pure white and porcelain-like body (Li 1998:Table 5-2). In contrast, common clay-manufactured wares have a grey and stoneware body (Li 1998:5-2).

Shapes and decorations

Xing white bowls and teacups have a similar shape to Yue celadon, with a bi-disc footring on a low and flat base, and a short but straight body. The difference is that some Xing white wares have a round rim which looks much thicker than the Yue celadon rim. The wide rim and floral rim imitates metal work which was also popular (Li 1998:176-177, Feng 2009:329). Ewers, jars and vases also share a similar shape with Yue celadon, in that they have a thick, heavy and short body, and a short spout.

Bowls and plates are seldom found with decorations, and pure, undecorated wares are very common. The aim was to highlight the expressiveness of the pure white and jade-like glaze (Feng 2009:330). A limited number of jars, ewers and vases have moulded, sealed or carved decorations, which was common during the Tang dynasty. During the period from the Five dynasties to the Northern Song era, the Xing kilns declined sharply and were influenced by other kilns, such as the Jingdezhen kilns and Yaozhou kilns, and carved decorations on wares from the Xing kilns became common but of a poor quality, and may not have been for trading purposes (Li 1998:177).

Dating evidence

Xing white stonewares manufactured in the Xing kilns have a long history which can be dated to as early as the late Sui dynasty (Huang 2009:168). Dating evidence of late Tang Xing wares comes from both tombs and temple sites. Tombs and remains with the Xing white wares can be dated to the Tang Dynasty and a group of trustable tombs located in Lincheng city in Hebei Province yielded a set of fine Xing white wares, including jars, ewers, bowls and plates, which can be dated to 856 AD. The bowls have a bi-disc ring base marked with 'Ying'. This is similar to the Xing white wares from the Belitung shipwreck (Li et al. 1990). A tomb located in Yixian County in Hebei Province dated to 864 AD, yielded a set of Xing white wares, including ewers, vases, plates and bowls. Again, one white vase has a ring-base marked with 'Ying' (Shi 1988:66-70). A Tang temple located in Chang'an city has yielded over 40 pieces of white Xing wares, which similarly have a bi-disc ring base and are marked with 'Ying' (Figure 4.9). This temple, named 'Xi Ming Si' (西明寺), was well-recorded in Chang An Zhi (History of Chang'an) and was established in 656 AD and destroyed during the late Tang period (An 1990:54-55). Another Tang temple, 'Qing Long Si (青龙寺)' has also been excavated and six pieces of Xing white bowls were found. These bowls have a bi-disc ring bas, also marked with 'Ying'. A bowl marked with calligraphic writing, 'Da Zhong Shi San Nian San Yue (13th March, 859 AD)' has also been discovered (Zhai and Wang 1997).

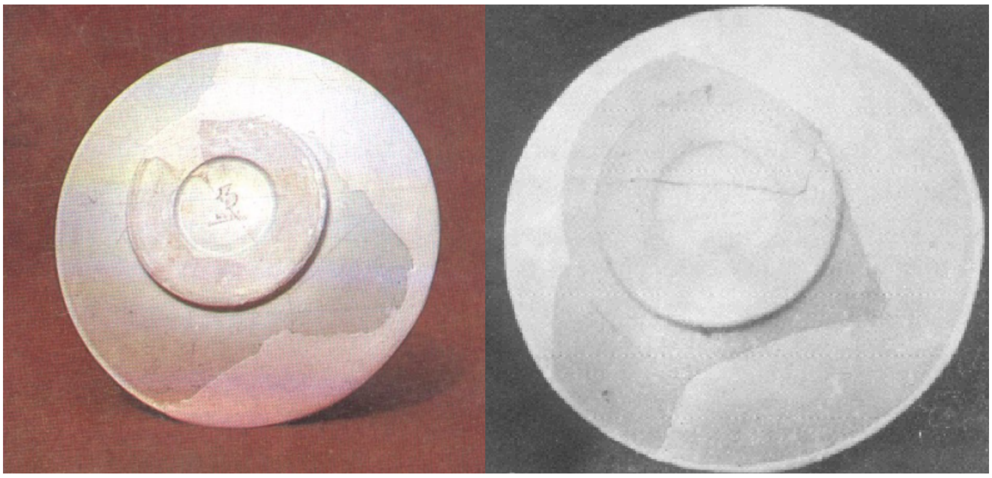


Figure 4.9: Xing white bowls with a bi-disc footring found at the Xi Ming Si temple site.
(left) (An 1990) and Qing Long Si Temple Site (Right) (Zhai and Wang 1997)

21. DINGW I (early Ding White stonewares, also the Xing white stoneware imitations, the sub-class of XINGW)

(cf. Quan 2008)

Body type: Stoneware/Porcelain **Origin: Hebei**

Drawing: see Appendix 6-Drawing 11: 5-11

Definition

The fine quality white stoneware also fired in the Ding kilns is not mentioned any historical records until the 10th century. However, it has been demonstrated through strong archaeological evidence from the Ding kiln sites located in Quyang county of Hebei Province, that in the late Tang period good quality imitation white stonewares in the type of Xing wares were being fired. Therefore the Ding kilns are regarded as the successor to the Xing kilns for northern white ware manufacturing (Vainker 1991:93, Feng 2009:330-331). According to the dating evidence from tombs (dated between 834 and 896 AD)(GZSWWGLWYH 1956, HNSWWKGYJS 2001), the Ding kilns started to fire fine white stoneware no later than the middle of the 9th century (Quan 2008:41-42, 44).

However, it should be noted that early Ding white stonewares are notoriously difficult to distinguish from Xing wares (Vainker 1991:93), leading to confusion for archaeologists and ceramists (Zhao and Zhang 2007, Quan 2008). Moreover, the Gongxian kilns (巩县窑) were also producing good quality white stonewares during the late Tang period (Quan and Meng 2008:162).

Comparison to Xing white wares

In general, Ding white stonewares have very similar fabrics for both the paste and glaze to Xing white wares. Ding white stoneware may have the following features. The outside surface is poor-refined in terms of the body and glaze, although this does not indicate that the Ding white stoneware is of poor quality, rather that wheel marks can be more easily found on Ding white wares than Xing white wares. The applied glaze on the outside surface is uneven and traces of glaze running down to the middle part of the bowls can be very often seen; these glaze-running marks have been called ‘teardrops’. The bi-disc footring and base of Ding white stonewares are normally unglazed, while Xing wares have a full glazed base on the inside area of the footring. Finally the rolling rim is unevenly everted (Vainker 1991:93-94, Feng 2009:330-331).

22. DINGW II (Ding white stonewares)

(cf. Lin 1965, Zhang 1995)

Body type: Stoneware/Porcelain **Origin: Hebei**

Drawing: see Appendix 6-Drawing 12: 1-7

Definition

From the late 10th to the early 11th centuries Ding white stonewares continued to be fired in Quyang county of Hebei Province, whilst the Xing kilns declined. The Ding kilns have a long history which ended during the Yuan dynasty. However, in terms of traded ceramic products found at sites in the western Indian Ocean, Ding white stoneware has been rarely found and can only be dated to the northern Song dynasty (960-1127 AD). Therefore, this class (DINGW II) only covers Ding white stonewares dated to the late 10th to 12th centuries.

Detailed Description

DINGW II wares have a porcelain-like stoneware body, which is hard (high-fired), pure but slightly porous. The thickness of the body of the bowls or plates is thin; therefore, many of these wares are translucent. The body is normally light greyish white or light greyish and yellowish white, due to the coal-fired oxidising atmosphere in the 10th century and later (Vainker 1991:94). The glaze is thin and light yellowish white, or called ivory white, which is also due to the oxidizing atmosphere. Teardrop marks in the glaze remain present (Lin 1965, Vainker 1991:94-95).

The shapes of DINGW II wares mainly consist of bowls, plates, boxes, cups and cup-stands, vases and jars. For traded wares, bowls and plates are common. Unglazed rim wares (called *Mang Kou*, literally rough rim, see Figure 2.2 in Chapter 2) can be found, which are a result of the reversed placing employed by the kiln setters. This setting method was first utilised in the Ding kilns and was then introduced to the southern Chinese kilns (see JDZQB II, QB I Type and QB II Type). The date of *Mang*

Kou type wares is still debated (Lin 1965:411, Feng 2009:377); however, the Ding kilns reach their peak in production quantity and quality in the 11th to 12th centuries, and at this time the reverse setting method was widely applied (Vainker 1991:95-96).

In the term of decorations, the featured have changed. In the early Song dynasty (approximately in the second half of the 10th century), plain wares and bowls with lotus petals in relief on the exterior were common. In the 11th century carved and simplified flowers on the inside surface became popular and by the late 11th century to the 12th century, moulded and complicated designs were widely applied. The decorating designs mainly consisted of flowers, grass, phoenixes, butterflies, birds, dragons with sea-waving patterns, fish and so forth (Feng 2009:377-378).

Table 4.6: Key dating evidence for class DINGW II.

Site Type	Locations	Findings	Dating	Reference
Tomb	Liaoning	Bowls, Plates, Ewers	959-986 AD	(Feng 1975)
Pagoda Remains	Hebei	Bowls, Plates, Ewers, etc.	995 AD	(DXBWG 1978)
Tomb	Beijing	Plate, Bowls and Jars	1053 AD	(BJSWWGLC 1972)
Tomb	Beijing	Bowls, Plates	1161 AD	(BJSWWGLC 1977)
Tomb	Nanjing	Bowls, Plates	1199 AD	(NJSBWG 1973)

Table 4.6 lists some of the key archaeological sites that have yielded Ding white wares and the dating evidence. It can be seen from the Pagoda remains in Hebei that Ding white wares had already become a type of luxury for temple offering purposes; these white stonewares had been buried with metal wares, jade wares and glass wares for the funerals of monks in the basement of these pagodas (DXBWG 1978:45-48). It is also interesting to see that Ding stonewares were highly regarded as luxury items until the Southern Song period, when Song China lost the northern territories and trade between north and south China was severely limited. Bowls and plates were buried in the tomb of Zhang Tongzhi (张同之), together with other luxuries, such as sliver wares, crystal beads and bronze mirrors (NJSBWG 1973:61-62).

23. CW I (Northern Chinese coarse white stonewares dated to 8th to 9th centuries)

(cf. Feng 1964a, b, Zhou et al. 1995, BJYSBWG 2011)

Body type: High-fired Pottery/Stoneware **Origin: Northern China**

Drawing: see Appendix 6-Drawing 12: 8-13

Definition

Class CW I refers to high-fired pottery or low-fired stoneware with a white slip that was mainly produced in northern China. According to the shapes, this class can be roughly dated to the 8th to 9th centuries (including the early and middle of the 10th century) (Feng and Li 2005a, b, Feng 2009). At this time southern China did not produce white stonewares (Li 1998:146). The main kilns of this class are the Gongxian kilns, Xing kilns, Ding kilns and Mixian kilns (密县窑) in Hebei Province (Feng 1964b, 2009, BJYSBWG 2011:328-331). Ceramic products from the Gongxian kilns are the most common.

Description

In comparison with the high quality Xing white stonewares and the Ding wares (XING I and DING I), CW I wares have a much low quality body fabric, which is soft (pottery-like stoneware) and porous, with very small black inclusions. The colour of the fabric mainly ranges from whitish grey to grey. Therefore, in order to whiten the low quality body, a thin layer of white slip was normally applied, which is milky and even, before applying the transparent glaze. Many wares were half glazed.

The ware shapes of class CW I are normally similar to those of the XING I and DING I classes, in that they are low and heavy, with a bi-disc footring. A flat base can be found, together with both rolled and straight rims. In terms of decorations, CW I wares are plain and very rarely are decorations seen, although some bowls are in the form of four floral petals (Feng and Li 2005a, b, BJYSBWG 2011:78).

Dating evidence

At Beiyaowan in the Gongyi city of Henan Province, many tombs date from about the 3rd to 10th centuries AD. Among these tombs and dating to the Tang period, some bowls with a white and milky slip have been found (Tombs: M2 and M15). These tombs have been attributed to the late Tang period through their coins and tomb structures (cf. Zhao et al. 1996:386-389, BJYSBWG 2011).

24-25. CW II & CW III (coarse white stonewares)

Body type: High-fired Pottery/Stoneware Origin: Northern/Southern China

Drawing: see Appendix 6-Drawing 13

Definition

Class CW II consists of white stoneware produced in both northern and southern China. Low quality white stoneware produced in the Cizhou kilns (磁州窑) in Hebei Province and the Xicun and Chaozhou kilns in Guangdong Province have been found in the western Indian Ocean (Kennet 2004:63, Zhao 2006:91, Yuba 2014:6). Northern Chinese coarse white stonewares can be easily distinguished from southern China ware according to the hardness of the body and the glaze fabric.

General description

It remains unclear as to which were the original kilns which produced the lower quality white stonewares in northern China, although it appears that the Ding kilns, Mixian kilns and Cizhou kilns were all producing lower quality wares (Feng and Li 2005a, b). However, the Guantai kiln site (观台窑址) of the Cizhou kilns in Hebei was one of the most important kiln sites for imitating high quality Ding white stonewares (see DINGW II) and it did not have its own unique style (Cizhou type) until the early 11th century (Qin 2000a:2-4). According to Qin Dashu, Ding imitation white stonewares were made by the application of white slip, which is yellowish white. Imitation wares were decorated by incised and carved designs consisting of fish, flowers and lotus petals (Qin 2000a:2). Wang Jianbao reported that low quality white stonewares were also produced at the Banbijie kiln site (半壁街窑址) and the Lushang Cun kiln site (炉上村窑址); both of which are Cizhou kilns. Their white stoneware products have a yellowish grey paste that is rough, and slip was commonly applied, which is greyish or yellowish white. A transparent glaze on top of the slip has very small crazing (Wang 2010:8-11). Similar sherds have been found in Sharmah and these have a good quality body, with a milky and yellowish green glaze. While these sherds cannot be categorically grouped with Guantai white stoneware, they do appear to have come from northern China (Zhao 2006:91).

In comparison with the northern Chinese coarse white stonewares, southern CW II wares have a relatively hard body, which is normally light greyish white (Kennet 2004:63, Yuba 2014:6). The glaze is sometimes greyish white, pure white and bluish white and some wares are similar to QBW II Type wares. It has been confirmed that most come from the Bijiashan kiln site (笔架山窑址) of the Chaozhou kilns and a very limited number from the Xicun kilns (GDSBWG 1981:10-11, FPSM 1985:67). Many of the southern Chinese stonewares were carved with multiple layers of lotus petals on the exterior, and the tops of the petals are pointed.

However, the current understanding of this class of white stonewares from Guangdong is still poor and similar wares cannot be identified according to the excavation reports from the Bijiashan and Xicun kiln sites (GZSWWGLWYH 1958, GDSBWG 1981, GZSWWGLWYH and AMOCUH 1987).

Dating of classes CW II & CWIII

According to Qin Dashu, Cizhou Guantai lower quality Ding white stonewares can be roughly dated to the 11th century (Qin 2000a:2-4), although from the Cizhou kiln sites it is apparent that low quality white stonewares continued to be manufactured into the 14th century (Wang 2010:8-11). The Xicun and Bijishan kiln sites have both been dated to the northern Song period, according to unearthed coins and typological studies of tombs (GZSWWGLWYH 1958:11, GDSBWG 1981:40).

4.4.4 Blue and white ceramics complex

Blue and white fired pottery wares were fired in the Gongyi kiln during the 8th to 9th centuries (HNSWWKGYJS and ZGWHYCYJY 2011) and porcelain wares were manufactured from the 14th century onwards (JXSWWKGYJS and JDZMYBWG 2007). All these wares were much appreciated in the Near East (Vainker 1991:138-139, Hallett 2010:77).

It should be noted that there is no direct link either technically or historically between the two groups of blue and white ceramics (pottery and porcelain), to chronologically group them together (Wang 2004b). Before the successful firing of blue and white porcelain, there is a long historical gap of about 400 years when there is no evidence of the firing of blue and white ceramic wares in China, although it has been suggested that both manufactures of blue and white pottery and porcelain were strongly influenced by the export ceramic demands from the Near East (Feng 2009:455).

This section will neither aim to further discuss the origin, nor provide archaeological evidence concerning the development of blue and white ceramics. Instead, this section attempts to separately introduce these key classes of blue and white ceramics during the 8th to 15th centuries.

There are two major classes of blue and white ceramics: Gongxian blue and white high-fired pottery (GXBW) and Jingdezhen blue and white porcelain (JDZBW). In general, JDZBW wares are high-fired porcelains, which can be easily distinguished from blue and white potteries produced in northern China or in other countries, such as Islamic blue and white and Southeast Asian blue and white wares. JDZBW wares have a wheel-turned or moulded and well-polished shape, with finely designed cobalt blue underglaze painted decorations. Because the JDZBW class has a long history, from the 14th to the 20th centuries, it can therefore be divided into five sub-classes (Figures 4.10 to 4.12):

(1) JDZBW I-1 (2) JDZBW I-2:	Yuan Dynasty (early 14th century to 1368 AD)
(3) JDZBW II-1 (4) JDZBW II-2	Early Ming Dynasty (1368 AD to the early 15th century)
(5) JDZBW III	Middle Ming (late 15th to 16th century)

The division of class JDZBW basically follows the chronological changes of porcelain wares, including the elements of shapes, pigments, painting patterns and marks. It needs to be noted that normally the variation in the blue colour from the cobalt pigment can be used to give the first reliable impression when examining a blue and white sherd. I use the word 'impression' because the final dating result must be based on the entire chronological information on shape, pattern, marks and body fabric of a ware or a sherd, and the blue colour may provide an incorrect date if a ware or sherd had been badly fired. The blue shades on blue and white porcelains can be divided into dark blue, light blue, purplish blue, blue and so forth.

Classes JDZBW I-1 and I -2 contain the group of Yuan blue and white porcelains, which were regarded as finely trade ceramics during the Yuan dynasty (Medley 1989, Vainker 1991). Historically, the Mongolian rulers were not interested in ceramic art and manufacturing during the early period of the Yuan dynasty, therefore ceramic wares were viewed as a type of 'useless' object but could be used for trading and exchange for 'useful' goods from foreign countries (咱每这田地里无用的伞…磁器家事…这般与了，博换些他每中用的物件来) (Anonymous 1998).

It can be confirmed that these classes were fired during the 14th century (Pope 1952, Medley 1989, Feng 2009), based on their decoration and forming quality. JDZBW I-1 wares represent the higher quality blue and white porcelains, and can also be called 'Zhizheng Type (至正型)' blue and white porcelains, while JDZBW I-2 wares represent lower quality blue and white porcelains and can also be called 'Yanyou Type (延佑型)' or 'Philippine type' blue and white porcelains.

The name 'Zhizheng' comes from the inscriptions on a pair of blue and white vases in the Percival David Foundation, where the inscription shows the absolute manufacturing date of these vases (至正十一年: the eleventh year of the Zhizheng Reign, 1351AD) (Harrison-Hall and Krahl 2009:52-53). Blue and white wares with similar decorations are therefore called Zhizheng type blue and white porcelain, and also the 'Fourteenth-Century Group', or Yuan Blue and White (元青花) in Chinese writing.

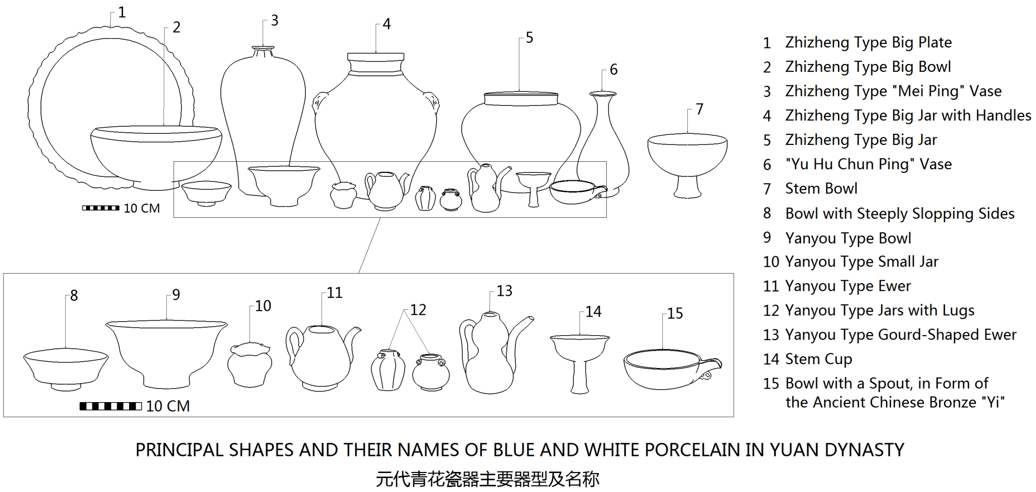


Figure 4.10: Principal shapes and the names of blue and white porcelain during the Yuan Dynasty.
(Drawing by Ran Zhang)

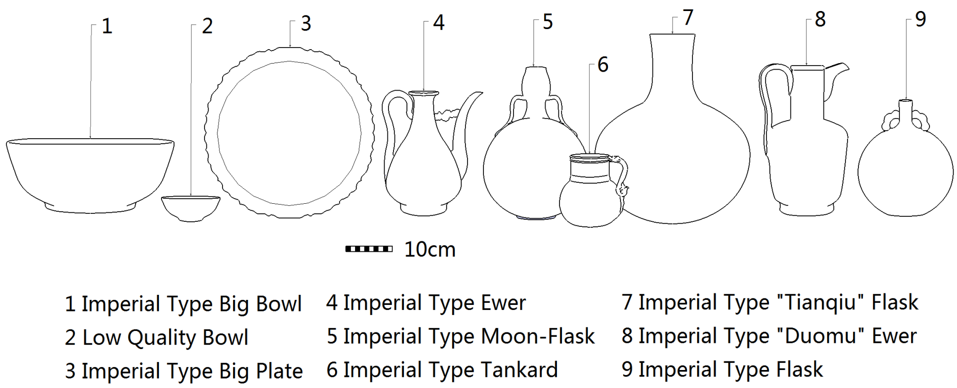


Figure 4.11: Principal shapes and their names of blue and white porcelain during the early Ming Dynasty.
(Drawing by Ran Zhang)

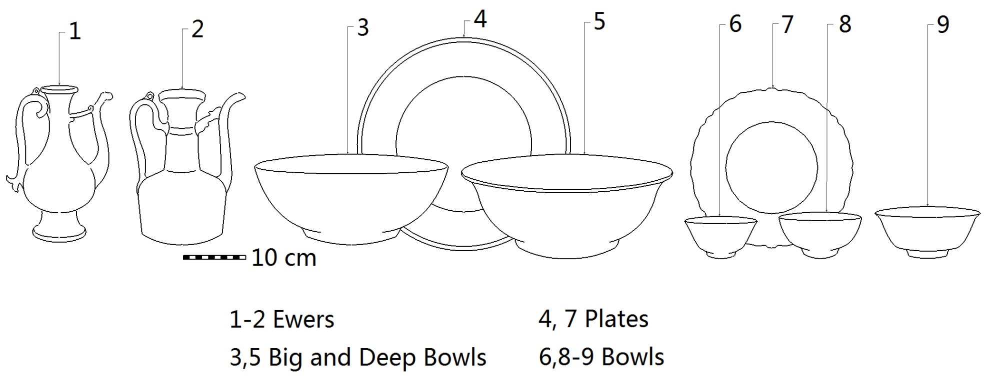


Figure 4.12: Principal shapes and their names of blue and white porcelain during the middle Ming Dynasty.
(Drawing by Ran Zhang)

The name 'Yanyou' comes from a Yuan blue and white jar from a tomb dated to 1319 AD (the sixth year of the Yanyou Reign in the Yuan dynasty 元延祐六年). This is the earliest example of Yuan blue and white porcelain with archaeological dating evidence (Wu 1984). However, this vase has an iron-blackish brown pattern coated with a light brown and transparent glaze, and therefore has been considered as iron-black blue and white, rather than a blue and white product (Lu 2012:50). The Yanyou type also has been named the Philippine type because there are a number of Yuan blue and white wares in a smaller size (in comparison with the Zhizheng type) with a simple and quick painted pattern that have been found in the Philippines (Addis 1968).

The current understanding on these two types is still debated and because the Yanyou type has not been fully accepted by Chinese scholars, with Huang Wei and Huang Qinghua suggesting that the Yanyou type is a form of early Yuan blue and white porcelain, which is from the growth and development period of Yuan blue and white (Huang and Huang 2012). Liu Xinyuan highlights that Yanyou type, or the Philippines type is a form of common porcelain products, which were fired in Jingdezhen between 1334 and 1386 AD, when production of official Zhizheng Yuan blue and white porcelain had been stopped. The potters working for the Fuliang Ciju (Fulian Porcelain Bureau 浮梁磁局) disbanded and started to produce porcelain freely in local common kilns, and this is why Yanyou type wares have free, quick and simple patterns (Liu 1982:18).

Class JDZBW II represents early Ming Chinese blue and white, and roughly dates from the Hongwu reign to the Xuande reign (1368-1435). This group has been found in relatively smaller quantities in the Indian Ocean sites, mainly because of the sea ban which was imposed at this time.

There are two sub-classes within JDZBW II. The first group, JDZBW II-1, consists of high quality blue and white porcelain, which can also be called imperial type porcelain (Lin and Zhang 2015:421-423). The second group, JDZBW II-2, is of a much lower quality. In general, JDZBW II is very similar to Yuan blue and white (JDZBW I) in both shape and cobalt patterning, and is of a large size with dark cobalt blue. However, the patterns and designs have been changed slightly (BJSWWYJS 2007:10-15).

Class JDZBW III represents a group of blue and white porcelain made in the Jingdezhen kilns, which can be dated to the middle Ming period (late 15th to the middle of the 16th centuries).

During the period of classes JDZBW II and III production (the middle of 15th century), there were changes to the export of blue and white porcelain. A period of shortage in the manufacturing of the blue and white porcelain in China, called 'an interregnum period' (空白期), represents when the firing of 'imperial porcelain' in Jingdezhen was stopped on the orders of the new Ming emperor, Zhengtong, who disapproved of Xuande's luxurious way of life since 1436 AD. Until the year 1457 AD, there are no reports of the re-opening of the imperial kilns in the historical records (Anonymous 1962:Yingzong Shilu, Xu et al. 1976:Vol. 194: 981). There no imperial porcelain fired during this period has the imperial mark. and it is assumed that no imperial porcelain was produced during this period (Krahl 1986d:529, Feng 2009:500-502).

26. GXBW (early blue and white high-fired pottery)

(cf. Wang 2004b, HNSWWKGYJS and ZGWHYCYJY 2011)

Body type: high-fired pottery **Origin: Gongxian kilns**

Drawing: see Appendix 6-Drawing 14: 1-2

Definition

Blue and white high-fired pottery wares have been found only in the Gongxian kilns in Gongyi city of Henan Province. They revealed a blue and white ceramic assemblage in rare quantities (only some sherds), representing a small group of polychrome painted wares of Gongxian ceramic productions. White stonewares (see class CW I), green splashed wares and Sancai wares (see class GXPW) were also found. As a small group of pottery products from the Gongyi kilns, these are highly considered by Chinese scholars as an exotic style of wares influenced by art and painting techniques from central Asia and the Near East (Wang 2004b:62-63, HNSWWKGYJS and ZGWHYCYJY 2011).

Detailed description

Early blue and white ceramics have cobalt-blue painting directly onto the biscuit wares. No white slip has been used but the body is light greyish white, white or yellowish white, and a transparent glaze has been applied after cobalt painting. The cobalt blue has black spots and is in different shades, greyish blue, dark blue and blue. The firing temperature is normally higher (about 1200°C) than for other polychrome wares (Wang 2004b:58-59) and results in a hard fabric.

Early blue and white ceramics normally have cobalt blue painted and stylised floral patterns, which have been called an overlapping lozenge motif (Krahl et al. 2010:80). Otherwise, freely splashed patterns, quick painted flowers and playing children can be seen (Ouyang 2011). The known shapes of early blue and white potteries are mainly plates, bowls, boxes, head-rests, jars and ewers (HNSWWKGYJS and ZGWHYCYJY 2011, Ouyang 2011).

Dating evidence

The earliest datable blue and white ceramic ware comes from the Zheng Rentai Tomb (郑仁泰墓) which dates to 664 AD (SXSBWG and LQXWJJ 1972). However, this is not an example of mature blue and white ceramics due to the firing temperature and painting techniques (Wang 2004b:58). Sherds of blue and white potteries have been found in the Tang remains of the Baihe kiln site (白河窑址) in Gongyi city. Among them, one sherd has a similar cobalt painted pattern to a dish found in the Belitung shipwreck (Krahl et al. 2010:260, HNSWWKGYJS and ZGWHYCYJY 2011:57)

<u>27. JDZBW I-1 (Zhizheng Type Yuan Blue and White Porcelain)</u>

(cf. Sun 1966, Krahl 1986b, Lv 2004, JXSWWKGYJS and JDZMYBWG 2007)

Body type: Porcelain **Origin: Jingdezhen Kilns**

Drawing: see Appendix 6-Drawing 14: 3-10

Definition

Class JDZBW I-1 wares are high quality ceramics, which are normally large in size

(Feng 2009). The common shapes consist of plates, bowls, stem cups, jars, and vases (Yu Hu Chun Ping & Mei Ping) (Figure 4.13, Figure 4.14: right and Figure 4.15: right), ewers and so forth (Figure 4.10). The Zhizheng type has been regarded as the official type or high class objects, some of which were produced for the Fuliang Cijufor central court (Liu 1981c). The inscriptions on the David Vases dates to 1351 AD and indicates that they are offering objects rather than for official use. This means that common class people in the Yuan dynasty could also own them. However, there is no debate that Zhizheng type wares were produced for central court and high-class individuals, and were produced under the supervision of the Fuliang Porcelain Bureau (Li 1994, Chen 2012). Many Zhizheng type products were used for export trading and were exchanged for 'useful' goods (Chen 2012).

Detailed description

Body, glaze and pigment

JDZBW I-1 wares have a heavy and thick porcelain body, which normally has been mould-formed and well-polished. Wheel-turned objects can also be found, and are normally smaller sized objects with a regular shape, without floral rims or other applique and ornamental decorations. Because they are a larger size, especially the jars and vases, these wares are normally divided into two or three sections when being formed and joint marks can be found on the internal surface. The body of JDZBW I-1 wares is dense, hard but not very pure, although purer than a stoneware body but not as pure in comparison to Ming and Qing blue and white bodies. Small pores can be observed by the naked eye in the greyish white body. The body has a clear red-stain, which is a thin line near the edge of the glaze, although sometimes the red-stain is full and is on the base where the body is exposed.

JDZBW I-1 wares have a transparent and thin glaze in a very light bluish green, which may be hard to see. A thicker glaze is relatively darker bluish green and crackles are only found very rarely. Bowls, plates, and stem cups are normally well and fully glazed, while vases, jars and ewers are well glazed only on the outside surface and their inside surfaces are freely and quickly, or not fully glazed. All the objects have an unglazed base (Figure 4.14: left) and the only exception is the Yu Hu

Chun Ping vase, which is full glazed (Figure 4.15: left) (Feng 2009:461).

Between the body and glaze, cobalt blue can be found, which has been painted onto the body and is dark blue or blackish blue. For the blue pigments, it was called *Su Ma Li* (苏麻离), and it has been believed that was imported from the Near East by both land and sea trades. For example, Liu Xinyuan suggests that Qamsar was the source for cobalt during the Yuan dynasty (Liu 1989). This imported cobalt ore is with a high percentage of inculsions of iron and manganese oxides (Kerr and Wood 2004:676-682). Small metal black points can be therefore seen on the blue patterns when examining sherds in bright sunlight, which are mainly because of the high percentage of iron, which gives a metal-black appearance to the pigment (Figure 4.16). These black points often occur on the cross-point of painting strokes or area filled with cobalt pigment (Sun 1966, Lv 2004), and are very common on blue and white porcelain from the Yuan and early Ming period. In comparison with late Ming and Qing blue and white porcelains, the Yuan blue and white has a much darker cobalt blue.

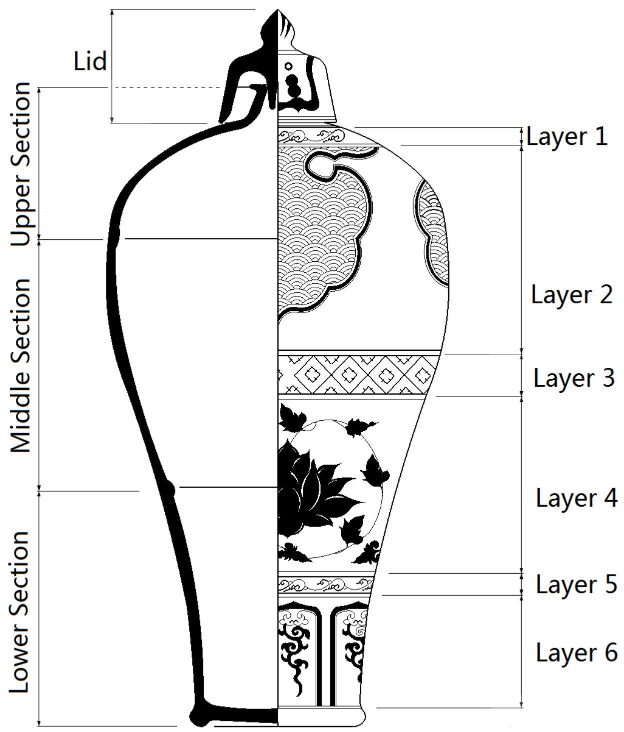


Figure 4.13: An example of a Meiping vase consisting of three sections and six layers of cobalt blue paintings.

(Drawing by Ran Zhang)

Figure 4.14: Base and shape of a blue and white porcelain Meiping vase dating from the Yuan dynasty

(Height: 401mm) *(SHBWG 2012:84-85)*

Figure 4.15: Base and Shape of a blue and white porcelain Yu Hu Chun vase dating from the Yuan dynasty.

(Height: 265mm) *(SHBWG 2012:86-87)*

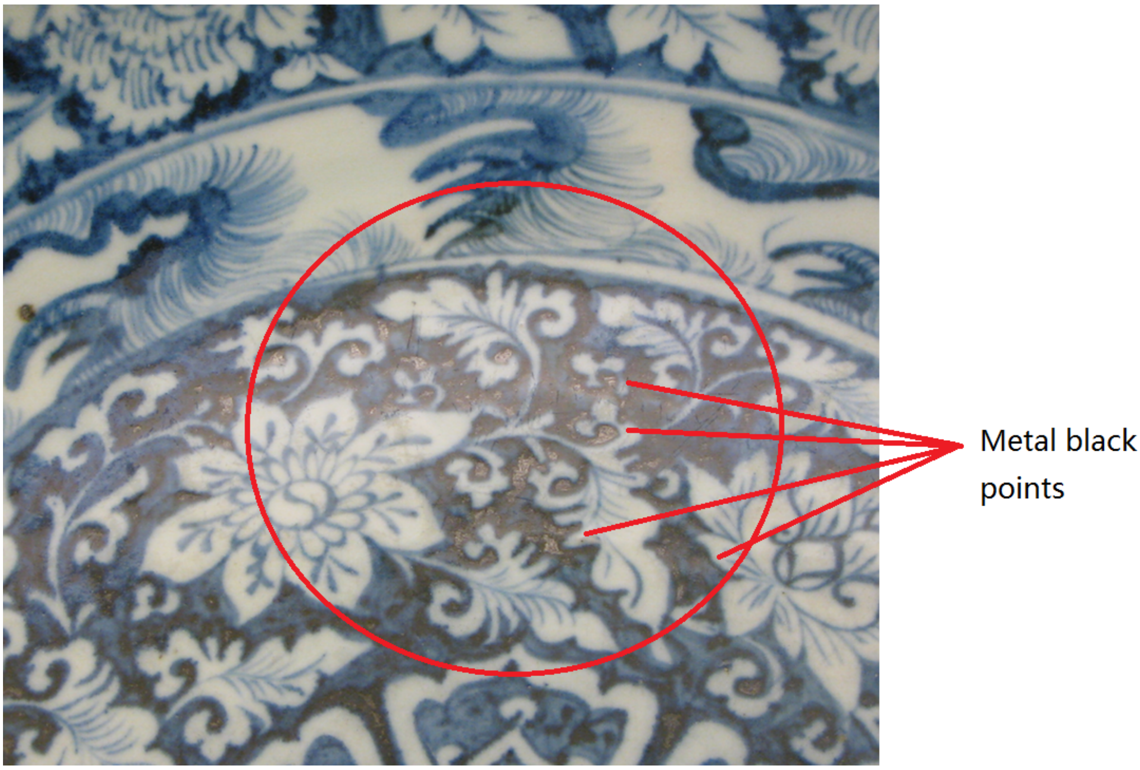


Figure 4.16: Metal black points in the cobalt blue patterns on Yuan blue and white porcelain. *(Photograph by Ran Zhang)*

Shapes, decorations and inscriptions

It has been noted that JDZBW I-1 porcelains are normally mould-formed and their shape are very large and heavy. Because of the mould forming, the plates and bowls have a floral rim, which is flattened and thickened. The heavy shapes need a thick footring, which is ex-turned or spread.

JDZBW I-1 porcelains have complicated cobalt blue decorations, which cover nearly the entire space on the porcelain surface. Regina Krahl suggests that these complicated decorations required a large painting space and this is one of the reasons why Yuan blue and white became larger than ever before (Krahl 1986c:74).

JDZBW I-1 porcelains have a neat and regular pattern design. Normally, an object has several layers of band decorations, which have different motifs. Plates often have three or five layers, jars normally have four layers, although five and seven layers have been found, while vases often have five to six layers (Feng 2009:459).

The motifs can be divided into the main motifs and decorative motifs. The main motifs include animals, birds, fish, flowers, fruits, figures (Figure 4.17), religious signs, dragons, phoenixes and so forth (see Appendix 6: Patterns 6 and 9). Decorating motifs include stylised grass, clouds, water-waves, floral scrolls, plants, lotus petals and so forth (see Appendix 6: Patterns 4, 5, 7, 8 and 10).

Figure 4.17: Scenes on a Yuan blue and white porcelain jar.
These describes a story from Yuan drama, the Sangu Maolu (三顾茅庐 The Three Visits to the Thatched Hut), from Sanguozhi Pinghua (三国志平话 Plain Narrative on the History of the Three Kingdoms).
(Carswell 2000:36)

There are some unique features in the decorating and painting of JDZBW I-1 porcelains. They do not necessarily occur on all porcelains but they are the most typical features for dating Yuan blue and white:

Leaves are always painted in the shape of a gourd, and a leaf normally has five pointed tops (see Appendix 6: Pattern 5). Flowers always have a white edge and flower petals are not fully filled (see Appendix 6: Pattern 6). Decorative lotus petals (Yang Lian Pattern 仰莲纹) have been separately outlined (In the Ming and Qing periods, Yang Lian lotus petals shared edges) (see Appendix 6: Pattern 7). Some lotus petals have a thick outline, which is fully filled with cobalt blue. The stylised water-wave patterns look like creeping worms, which is unique to Yuan blue and white porcelains (see Appendix 6: Pattern 8). The Ruyi-shaped panel has a triple-lined outline, where the middle line is thickened and the two other lines are very thin. Inside the Ruyi-shaped panel is filled with a stylised wave-pattern and normally with a horse, a lotus or flowers (see Appendix 6: Pattern 10).

Possible manufacturing kilns

JDZBW I-1 porcelains were fired in local kilns in Jingdezhen but no individual firing kiln for specially producing Yuan blue and white has been identified. It appears that many kilns in the Jingdezhen area during the Yuan dynasty were producing similar blue and white porcelains. Zhizheng type wares were fired in the kiln sites on the southern bank of the Nanhe River of Hutian (湖田南河), Luoma Qiao (落马桥) and Zhushan (珠山) (cf. Kerr and Wood 2004:676, JXSWWKGYJS and JDZMYBWG 2007)

Identification points for small sherds

Broken and small sherds of the class JDZBW I-1 may not have the featured patterns, but there are several points, which can help in identifying Zhizheng Yuan blue and white (cf. Sun 1966, Lv 2004, Feng 2009:461-462):

- It has a very thick body: 1 centimetre or more.
- The porcelain body is relatively soft and rough, with some small pores.
- The cobalt is dark blue with many metal black points.
- The glaze is thin and transparent, and in a very light bluish green.
- The cobalt blue patterns are neatly painted (not freely).
- The base or footring is unglazed when examining a base sherd.
- The footring normally is ex-turned
- Could find red-stain at the area where the body exposed

<u>28. JDZBW I-2 (Lower Quality Yuan Blue and White Porcelain)</u>

(cf. Addis 1968, Liu 1981c, Li 2006)

Body type: Porcelain **Origin: Jingdezhen Kilns**

Drawing: see Figure 4.18

Definition

JDZBW I-2 is a group of lower quality Yuan blue and white, and these porcelains have a smaller size and a thin body in comparison with JDZBW I-1 objects. Their cobalt blue paintings are free and quick and items can be easily distinguished from

JDZBW I-1 mainly based on the porcelain quality. JDZBW I-2 porcelains have been widely discovered in Southeast Asian, especially in the Philippines. However, they have been also found in India and Iran in a significant amounts (Chen 2012). This group of porcelain has been regarded as Yanyou type blue and white, which Liu Xinyuan noted as being freely manufactured without the strict patterns and shapes designed for official courts, which is the opposite of JDZBW I-1 wares.

Description

Body, glaze and pigment

JDZBW I-2 porcelains are much smaller in size with a thin body, normally no thicker than 1 cm, often 0.5 cm. They have a porcelain body but it is relatively soft and rough, which this is very similar to JDZBW I-1 porcelain. JDZBW I-2 objects are normally wheel-turned and the shape is simple and regular without ornamental decorations.

The glaze is more similar to Qingbai porcelain, which is light bluish green. A thin and transparent glaze can also be found, which is similar to the glaze of JDZBW I-1 porcelain. JDZBW I-2 wares also have a dark blue pattern, which shows no differences compare to JDZBW I-1 patterns. However, the cobalt ore may not have been well-prepared and therefore the high percentage of iron gives the blue colour greater variation, from dark blue to greyish blue.

Shapes and decorations

JDZBW I-2 porcelains were much smaller in size in comparison to JDZBW I-1 wares and their shapes mainly consist of bowls, small jars (e.g. Figures 4.10 and 4.18), stem cups, small boxes, small ewers and small Yu Hu Chun Ping vases (Figures 4.10 and 4.19). Bowls also have ex-turned, heavy and thick footrings, small jars always have two or four ring-lugs near the rim, and ewers with a long spout are normally in the form of a gourd or pear. The bases of JDZBW I-2 wares are normally unglazed (the Yu Hu Chun Ping vase is an exception).

JDZBW I-2 porcelains also have much simpler pattern designs, with the floral scroll being the most common pattern. Chrysanthemums and Gardenia florida (a flower typically with six petals) are the most common flowers on these scrolls, although sunflowers can also be found, and their centres have a cross-hatched flower pad. The floral scroll has been achieved using flicks of the brush to the left, which gives a ‘windblown’ effect (layer 2). The stylised leaves are usually drawn in outline only, and are used to decorate the lower section of jars and vases (Addis 1968, Liu 1981c).

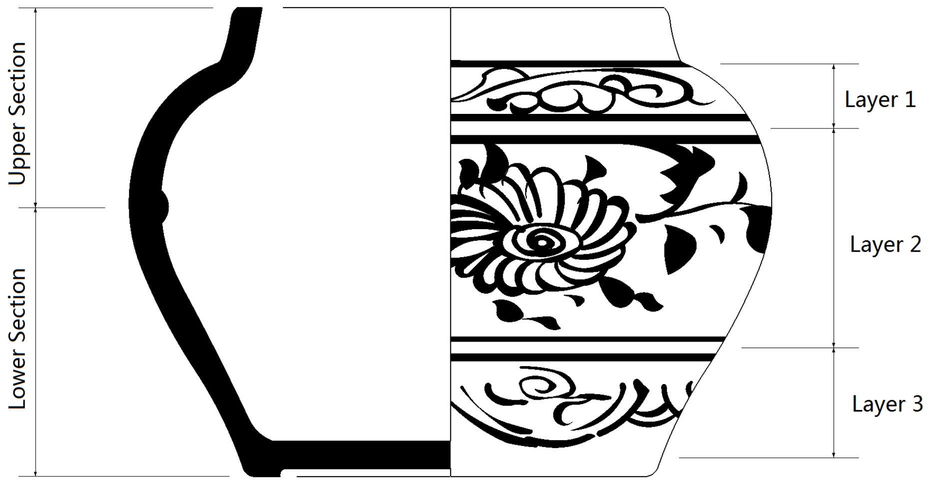


Figure 4.18: An example of a small jar from class JDZBW I-2
(Drawing by Ran Zhang)

Figure 4.19: Yuan blue and white small jars in the Yanyou type, also called the Philippine type.
(Addis 1968:plate39-b)

Possible manufacturing kilns

Similar to JDZBW I-1, JDZBW I-2 porcelains were also fired in the Jingdezhen local kilns and again no individual firing kiln has been identified. It has been suggested that they were fired in the northern bank area of the Nanhe River of Jingdezhen City (Liu and Bai 1980, Li 2006), and further kiln site information and archaeological evidence is eagerly expected.

Identification points for small sherds

Broken and small sherds from class JDZBW I-2 are more difficult to distinguish in comparison with JDZBW I-1 sherds, because their cobalt blue pattern is freely and quickly painted, which can be easily confused with early Ming blue and white production. There are several key features that may be helpful for identifying them:

(1) JDZBW I-2 wares are of a much smaller size and have a thin body, normally no thicker than 1 cm and sometimes between 5mm and 7mm.

(2) The porcelain body is relatively soft and rough with rare small pores, which is similar to JDZBW I-1wares.

(3) The cobalt is dark blue but sometimes lighter than the cobalt blue of JDZBW I-1porcelain.

(4) The glaze is thin, transparent and light bluish green, which is similar to Qingbai porcelain.

(5) The cobalt blue patterns are freely painted and have one, two or three decorating layers; paintings of leaves exhibit the ‘windblown’ effect.

(6) The base or footring is unglazed when examining a base sherd.

(7) The footring is normally ex-turned.

(8) May find a red-stain at the area where the body is exposed.

Distribution of JDZBW II (Yuan Blue and White Porcelain)

The distribution of Yuan blue and white porcelain in the Indian Ocean, including East Asia, has been studied and reported by Chen Jie (SHBWG 2012:256-265). To further focus upon the western Indian Ocean, Table 6.9 in Appendix 5 gives more sites and information that have previously been ignored (see column CBW: KN60).

But this table excludes the well-known museum collections, such as the Topkapi Museum in Turkey (39 pieces of complete Yuan blue and white porcelain wares) (Krahl 1986b) and the Ardebil Shrine (33 pieces) (Pope 1956), and this is mainly because they are not archaeological materials.

In particular the sites of Tughlaq Palace (Site 2) in India, Hormuz Island (Site 53) in Iran, Fustat (Site 101) and Aydhab (Site 127) in Egypt and Kilwa (Site 108) in Tanzania, have yielded a certain number of Yuan blue and white porcelain. Moreover, the Red Sea Shipwreck produced a number of Yuan blue and white porcelain sherds and they are in variations of shapes and painting motifs. The understanding of these sherds is still relatively limited due to the fact that they are in private collections (Carswell 2000, SHBWG 2012). This material urgently needs further study.

29. JDZBW II-1 (High quality early Ming blue and white porcelain)

(cf. Krahl 1986b, Geng 1993b, BJDXKGWBXY et al. 2007, 2009)

Body type: Porcelain **Origin: Jingdezhen Kilns**

Drawing: None

Definition

JDZBW II-1 is a group of high quality porcelain, which normally is large in size and has a heavy body. Common shapes are plates and bowls, vases, ewers and Kendi ewers. The good quality of this class is represented not only by the well-formed and fine-glazed porcelains, but also imperial type porcelain (or called imperial pattern porcelain 官样瓷器), which have both been found in small quantities in archaeological sites in the Indian Ocean, such as at Hormuz island (from the Williamson Collection) and Fustat in Egypt (Yuba 2014:11-12). Examples can also be found in a large number of museum collections, such as the Topkapi Museum (Krahl 1986c:66).

This group may indirectly be linked to Zheng He's voyages and his expeditions to the Indian Ocean may have presented these high quality ceramics as gifts to the Sultan, local kings and officers in the Indian Ocean. Therefore, JDZBW II-1 wares mainly consist of imperial type blue and white porcelain and high quality blue and white porcelain.

Description

Body, glaze and pigment

Like the Yuan blue and white in class JDZBW I-1, JDZBW II-1 wares also have a heavy and thick porcelain body (but thinner than Yuan blue and white), which is dense and hard. The body fabric is purer than in Yuan blue and white. JDZBW II-1 porcelains also have a transparent and thin glaze in very light bluish green, like JDZBW01-1. Crackles can only be be found very rarely in the glaze, and all the wares have been finely glazed. Bowls, plates and large pieces of objects normally have an unglazed base (Figure 4.11) (Feng 2009:461).

The cobalt blue has been painted between the body and the glaze, and is dark blue or blackish blue. Small metal black points can also be seen in the blue patterns when examining sherds in bright sunlight, is similar to Yuan blue and white and again due to the cobalt ore containing a high percentage of iron, which gives a metal-black appearance to the pigment. These black points often occur on the cross-points of painting strokes or the areas filled with cobalt pigments. The cobalt blue is more evenly dispersed than on the Yuan blue and white (JDZBW I), and the pattern design painted has a dispersed effect (Figure 4.20).

Figure 4.20: The dispersed cobalt blue on porcelain in classes JDZBW II-1 (left) and II-2 (right).
(Krahl et al. 1986a: 395-pic 567; Yuba, 2014: 13-fig.7-1)

Shapes, decorations and inscriptions

Plates and bowls are common shapes in class JDZBW II-1, although Tianqiu bottles, Baoyue flasks and Meiping vases are also popular in this period. Generally, the size of the plates and bowls is slightly smaller than Yuan blue and white porcelain but larger pieces can also be found with diameters up to 60cm (cf. Geng 1993b:Chapters 2, 3).

Cobalt painted patterns have changed but are still dark blue with metal points. Complete collections of high quality ceramics can be seen in the Topkapi Palace in Turkey and the Ardebil Shrine in Iran, which perfectly represent and depict early imperial Ming blue and white porcelain. The motifs on the plates or bowls have been carefully and neatly painted, and are not as fully distributed as the Yuan blue and white porcelains. The patterns on JDZBW II-1 wares have been painted neatly and complicatedly but there is much more un-painted space for the white background in comparison with Yuan blue and white. The decorating pattern of lotus petals in this period is not separately painted, and the stylised sea-wave pattern is more similar to real sea-waves, than appearing worm-shaped (see Appendix 6: Pattern 11). Sanskrit or Tibetan letters are used as the decorating patterns painted near the rims of plates, bowls and on the middle section of ewers, and these letters can be read as spells.

Figure 4.21: An Imperial blue and white bowl in early Ming Dynasty.
(Height: 165mm) (Krahl 1986b:411)

Two points need to be noted: 1) imperial type early Ming blue and white porcelain has only been very rarely found at archaeological sites around the Indian Ocean area (Lin and Zhang 2015); and 2) as a chronological development, some collections have both Yuan and early Ming features, which can be seen as transitional objects (during the Hongwu reign). As Figure 4.21 shows, this bowl has been dated to the early Ming period due to the merged lotus-petal pattern on the lower section. However, the floral scroll on the middle section and the stylized sea-wave near the rim retain features of the Yuan blue and white style, as the flowers have white edge, the leaves still have a gourd shape, and the sea-waves look like worm shaped.

Dating evidence

An imperial blue and white plate with Wucai-enamelled painting and decorative Tibetan letters can be dated to the Xuande period (AD 1426-1435) based on the cobalt blue reign mark '*Da Ming Xuan De Nian Zhi* (大明宣德年制, Made in the Xuande Reign of the Great Ming Dynasty)' and legible Tibetan alphabet decoration was common in the early Ming period (TJIOCA and TFPSM 1992:141-143). In the western Indian Ocean, a similar type of blue and white porcelain was also found in Julfar in the United Arab Emirates between 1988 and 1995, and dating by Pirazzoli-T'Serstevens (2003:3-10) suggests it is from the early 15th century and likewise for finds in Fustat in Egypt dated by Tadanori Yuba (2014:10-11).

30. JDZBW II-1 (Low quality early Ming blue and white porcelain)

(cf. BJSWWYJS 2007)

Body type: Porcelain **Origin: Jingdezhen Kilns**

Drawing: see Appendix 6-Drawing 15: 1-8

Definition

Lower quality blue and white from class JDZBW II-2 can be roughly dated to the early Ming period, including the very late Yuan dynasty (approximately the middle of the 14th century to the middle of the 15th century). The dating of this group is very different compared to JDZBW II-1, as the high quality porcelain could be dated much more precisely because the imperial type porcelain closely following dynastic changes and was strongly influenced by imperial ceramic designs and manufacturing. The lower quality blue and white porcelain in this group covers a longer period than the high quality group, mainly because chronological changes occur slowly and are only slight.

Description

Body, glaze and pigment

The body of JDZBW II-2 wares is relatively rough, and it is hard but not dense. Some examples have a stoneware-like body but this is harder than stoneware. The body is light grey and the area where the body is exposed on the footring commonly is red-stained. A spanning mark can be seen on the footring, which seems to have been formed very quickly and not polished very well (NJSBWY 1976).

JDZBW II-2 has a transparent and thin glaze in a very light bluish green, which shows no differences compared to other groups of blue and white porcelain in classes JDZBW I and II. Only very rarely can crackles be found in the glaze, and the porcelain has been glazed quickly and unevenly. Sometimes, there is an unglazed ring on the inside base of wares, which means that they have been manufactured as a group within a saggar. All bowls, plates and large pieces of objects have an unglazed base. The cobalt blue pattern has a much lighter blue than JDZBW I and JDZBW II-1 porcelains. The pattern has been quickly painted and the motifs, such as floral scrolls, have been stylised and cannot be easily recognised. Lower quality blue and white porcelain wares dating to the early Ming period have various colours of glaze and body because of the un-balance kiln atmosphere.

Shapes, decorations and inscriptions

Plates and bowls are common in class JDZBW II-2, and are of an intermediate size with a diameter no larger than 20cm (normally 15cm), according to the excavation of the Maojiawan Site in Beijing (BJSWWYJS 2007:10-15). The ex-turned footring from the Yuan dynasty had changed to in-turned. Bowls and plates normally have a wide mouth and the body is becoming thinner.

The pattern designs are freely and quickly painted: floral scrolls, flowers, fish or birds designs on the outside surface are highly stylized, and cannot be easily recognised. Chinese characters or Sanskrit letters of a larger size than the letters on JDZBW II-1 wares, which may not be readable decorate the outside of wares (BJSWWYJS 2007). On the inside of bowls, Chinese characters, such as ‘Fu (福, Luck)’ or ‘Shou (寿, Long Life)’ are found in the centre (see Appendix 6: Pattern 12) (Geng 1993a:13, Li 2000). Flowers, lotus and grass have also been found painted on the inside.

Dating evidence

Lower quality blue and white porcelain sherds were found at the Maojiawan site in Beijing between 2005 and 2007 and have been dated to the early Ming period (BJSWWYJS 2007:302-305).

Possible manufacturing kilns of JDZBW II wares

Possible manufacturing kilns of JDZBW II wares are uncertain because these are imperial type ceramics and low quality porcelain rather than imperial ceramics. Early Ming blue and white porcelain was manufactured at the kiln site located on the northern hillside of Zhushan hill (珠山北麓) in Jingdezhen (BJDXKGWBXY et al. 2007:44). However, JDZBW II wares have a similar body and fabric to imperial ceramics, which indicates that they come from the same kiln (the lower quality may come neighbouring kilns in Jingdehzhen).

31. JDZBW III (Middle Ming blue and white porcelain)

(cf. Krahl 1986b, BJSWWYJS 2007)

Body type: Porcelain **Origin: Jingdezhen Kilns**

Drawing: see Appendix 6-Drawing 15: 9-18

Definition and dating

This is a group of blue and white porcelain made in the Jingdezhen kilns, which can be dated to the middle Ming period (approxi. the late of 15th to the middle of 16th century). However, it should be noticed that the definitions of blue and white porcelain from the middle Ming period are many and unclear. Regina Krahl stats that Chinese porcelain from the middle Ming dynasty roughly covers the period from the late Xuande reign (1426-1435 AD) to the Jiajing period (1521-1567 AD), including the 'interregnum' period (1436-1464 AD) (Krahl 1986c:529), based on the understanding of the Chinese ceramic collection which includes blue and white porcelain, monochrome porcelain and polychrome porcelain, kept in Topkapi Museum. Simlar division has defined this period more precisely to the period from 1433 to 1554 AD, according to Chinese historical events (Liu 2005:16-17). Lv Chenglong, by his lecture in 2008, voices a different opinion and defines blue and white porcelain of the middle Ming period starting in the Chenghua period and ending in the Zhengde reign (1464 to 1521). His argument is mainly based on the changing cobalt ore applied to the porcelain, which gives a different colour to blue and white porcelain, and can be distinguished from the earlier and later periods (Lv 2008).

The JDZBW III class is mainly based on Lv Chenglong's argument which defines blue and white porcelain of the middle Ming dynasty by the cobalt blue changes to the porcelain as one of the most important features for distinguishing them from other blue and white groups. It needs to be noted that based on Lv's argument, precise dates for this period cannot be provided because the use of cobalt ore gradually changed from a period to the next, which this change not following dynastic or historic changes. The introduction of so-called Hui Qing (回青) occurred in the Jiajing reign (1521-1567); however, it is difficult to precisely date the time of this introduction which marks the start of the late Ming blue and white porcelain period. According to a tomb dated to the 25th year of the Jiajing reign (1546 AD), Hui Qing blue was being applied to porcelain wares, but it had not occurred in another tomb dated to the 6th year of the Jiajing period (嘉靖六年: 1527 AD) (Yang 1983:90). Hence, class JDZBW III roughly dates from the late 15th to the middle of the 16th century.

The quality of all this class of porcelain is good but it is rare to find imperial type blue and white porcelain in archaeological sites, although it may have existed. Regina Krahl suggests that three sherds in the Williamson Collection can be identified as an imitation style of palace porcelain in the Chenghua reign (Priestman 2005:310).

Therefore, it is hard to divide JDZBW III wares into sub-groups, such as high and low quality types.

Description

Body, glaze and shape

The body and glaze of JDZBW III is more dense and pure, but this change is slight and sometimes the body and glaze may look the same as blue and white porcelain of the Yuan and early Ming period. The thickness of the body is much thinner than in classes JDZBW I and II, and the thickness of bowls and plates is normally about 1cm, rarely is it thicker than 1.5cm. The glaze is normally slight bluish white or the whiteness of an egg white.

The size of bowls and plates is normally intermediate and large, with the mouth diameter of intermediate sized bowls/plates no larger than 20cm/30cm (BJSWWYJS 2007) and for larger sizes is about 30cm/50cm (Krahl 1986c). Bowls and plates normally have an in-turned footring, which sometime is of the '*Wa Zu Guo Jian* (挖足过肩)' type, a typical footring of the middle Ming dynasty (Liu and Bai 1980). The shape of the bowls and plates varies, a wide rim, floral rim, straight body and round body can all be found (BJSWWYJS 2007).

It has been suggested that the large bowls and plates in this class were produced to imitate Yuan blue and white porcelain (JDZBW I-1) (Carswell 2000:131); however, this class has a much thinner body and can be easily distinguished from the Yuan porcelain group.

Pigment, decoration and pattern motifs

From the end of the 16th century, there was no historically mention about the imports of cobalt ore until the 20th century. It might link that the Chinese native cobalt ore had been successfully and vastly mined at that time Kerr and Wood 2004:684-685). The Chinese cobalt ore named 'Po Tang Qing' (陂塘青) or 'Ping Deng Qing' (平等青) results in much lighter blue colour with a bit of grey to blue and white porcelain. In the middle and late Ming dynasty, this cobalt ore was gradually substituted by another blue called 'Shi Zi Qing' (石子青), which gives an even more greyer blue.

Patterns in this group are quickly and freely painted and motifs of the Buddhist Vajra, a lion playing with brocaded balls, floral scrolls, lotus and stylised flowers are all common (see Appendix 6: Pattern 13). Almost all the paintings are diffused and strokes are thick, which is very similar to in class JDZBW II but the motifs are different.

The bowls and plates normally have a fully decorated pattern on both the inside and outside surfaces and blank spaces are rare. This style has been described as '*horror vacui*' (fear of empty spaces), and also occurs on Yuan blue and white. In this group the naturalism of motifs is lost, and they are fully stylised (Krahl 1986c:533) (Figure 4.22). For example, the floral scrolls may have an intermittent stalk and the blank space is fully filled with small flowers and leaves. The '*horror vacui'* effect was also applied to a low quality bowl made in Jingdezhen, which was decorated with dots (Priestman 2005:311, JXSWWKGYJS and JDZMYBWG 2007:354, 462-464).

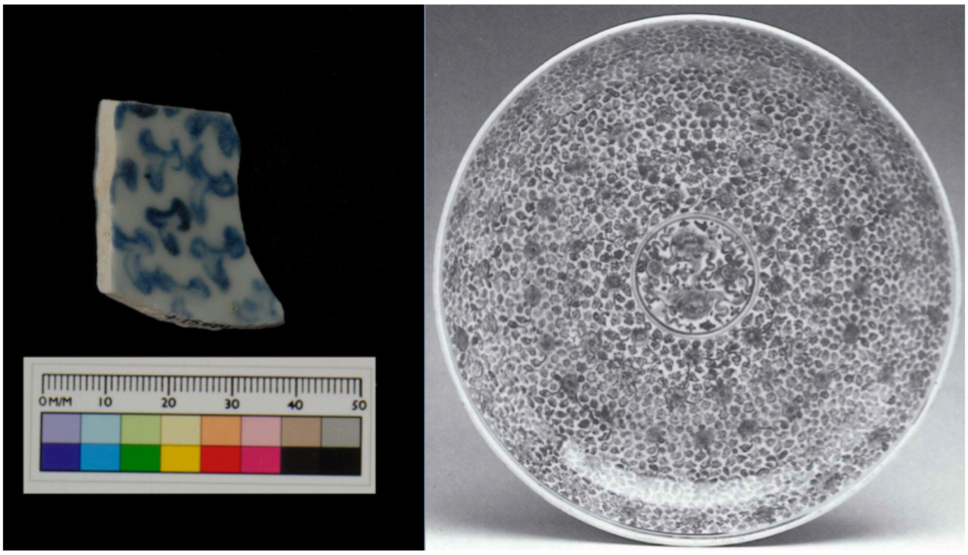


Figure 4.22: The so-called 'horror vacui' decoration effect on porcelain.
A sherd from the Williamson Collection (left) and a plate (right)
(Krahl, et al. 1986: 563-fig: 733)

Emperor Zhengde (1505-1521 AD) was fascinated by Muslim culture and artworks, including porcelain, turned to the Islamic style, with many items decorated with Arabic words or inscriptions (Krahl 1986c:534-536). These Arabic inscriptions on blue and white porcelain are therefore very helpful as they can be used to date the period to the early 16th century. Dishes with flattened and floral rim, a lion playing with a beribboned ball were used as decoration at the centre of the inside surface (Krahl et al. 1986: 539-fig: 647) (Figure 4.23).

So-called armorial porcelain wares were specially designed for the Portuguese royal family, with patterns such as armillary spheres, armorial and/or coats of arms. The earliest armorial porcelain wares made for the Portuguese market date as early as the 1520s and some pieces of armorial porcelain have been dated to the 1540s (Figure 4.24) (Matos 2002/2003:36, Lin 2010:89-93).

Figure 4.23: Porcelain bowl and pen-rest decorated with Arabic inscriptions.

(scales: height of a, b=135mm and width of c=197mm) (Left-Krahl 1986a: 444-fig: 778; right-the British Museum: 1973.7-26.366)

Figure 4.24: A ewer in the Islamic style and a bowl with armillary spheres and Portuguese arms dated to 1541 AD.

(Height: 270mm and 115mm) (Krahl 1986b:443- fig: 661; 449-fig:812).

4.4.5 Polychrome ceramic complex

The polychrome ceramics is a large group of wares that are the opposite to the monochrome wares, according to the glaze appearance of the ceramic wares. In many cases ceramics have painted patterns, using copper red or iron black patterns based on oxide firings (Vainker 1991:221, Pierson 1996:58). The early group mainly consists of underglazed painted wares (cf. Zhou and Zheng 1985, GZSWWGLWYH and AMOCUH 1987, CSYKTZ 1996), green splashed wares (cf. HNSWWKGYJS and ZGWHYCYJY 2011), Sancai wares (cf. HNSWWKGYJS and ZGWHYCYJY 2011), Cizhou wares (cf. Qin 2000b) and blue and white ceramics (see blue and white ceramic complex); the later group mainly consists of Jun-glazed celadon wares (钧窑) (cf. BJDXKGWBXY and HNSWWKGYJS 2005) and so-called hare-fur black glazed stonewares (兔毫盏) (cf. Li 1995a).

Because blue and white ceramics (both potteries and porcelains) are found in large quantities at archaeological sites and within historical documents, these have been separately introduced as classes within the blue and white ceramic complex. Therefore, this section will focus on introducing the key classes of other polychrome wares that were exported to the western Indian Ocean. There are six key classes of ceramics: GXPW (Gongxian polychrome wares), CSPW (Changsha polychrome wares), XCPW (Xicun polychrome wares), JTBW (Jian-type black wares), CZBWW (Cizhou black and white wares) and JDZCWP (Jingdezhen Copper-red and white porcelains).

In the Chinese ceramic trade to the western Indian Ocean, according to Dataset 3, except for Changsha polychrome wares, other groups were found in only small quantities. Xicun polychrome wares, Jian-type black wares, Jingdezhen red and white porcelains and Cizhou black and white wares have only been very rarely reported (Priestman 2005, Zhao 2006, Liu et al. 2012), and it is not certain whether Jizhou polychrome wares and Jun-glazed celadon wares were traded.

32. GXPC (Gongxian Green Splashed/Sancai Ceramics)

(cf. HNSWWKGYJS and ZGWWYJS 2007, HNSWWKGYJS and ZGWHYCYJY 2011, BJYSBWG 2011)

Body type: high-fired pottery/stoneware Origin: Gongxian kilns/southern China

Drawing: see Appendix 6-Drawing 16

Definitions

The Gongxian kilns located in Henan province were famous for producing polychrome wares that consist of green splashed and Sancai (三彩, literally Triple-colour). In addition, the Gongxian kilns also produced coarse white stonewares, which have been discussed in class CW I (Feng 2009:331-333)

The polychrome ceramics produced in the Gonxian kilns have a high-fired pottery body with a lead glaze. Sancai type glaze is common, followed by a green splashed glaze (Krahl et al. 2010). However, it has been suggested that Sancai and green splashed ceramics were also fired in northern Chinese kilns, including the Xing and Yaozhou kilns (Feng 2009, Li et al. 2010a). Unearthed green splashed white wares from the Belitung shipwreck have been confirmed as coming from the Gongxian kilns. This indicates that Gongxian green polychrome ceramic wares were important for the export market. Therefore, Sancai and green splashed have been grouped in this class, which is named Gongxian Polychrome Ceramics (GXPC).

Detailed description

The body of GXPC wares is relatively pure, dense but not that hard. The body is not heavy and the colour is normally greyish white and yellowish white. Wares were fired before glazing, at about 1100°C, to create biscuit wares (Li 1998:467). The transparent lead glaze is glassy, thin and evenly applied. Green splashed white wares are mainly based on white stonewares (similar to the CW I), which have been stained by a copper-green colourant in the glaze (Quan and Meng 2008:162). Sancai ceramics have a lead glaze stained by various colourants, such as copper green, iron brown, antimony yellow, and manganese purple. The firing temperature was about 800°C (Li 1998:467).

In terms of shapes, lobed dishes and bowls, stem cups, covered boxes, ewers, jars and cups can be found. Bowls and plates are a typical Tang type, and are low and heavy, with a straight body and a bi-disc footring. Some bowls have a moulded Chinese dragon applique at the centre of the interior (HNSWWKGYJS and ZGWWYJS 2007, HNSWWKGYJS and ZGWHYCYJY 2011). In terms of decorations, Sancai and green splashed ceramics are normally freely stained and designed patterns are rarely found (Krahl et al. 2010:80).

Dating evidence

According to tombs and kiln sites, the Gongxian kilns and their polychrome wares can be dated to the Tang dynasty (Quan and Meng 2008, Feng 2009). Green splashed wares were unearthed from the late Tang layer of the Baihe kiln site located in the Gongxian area. These were more popular later than Sancai ceramics (Wang 2004b:58-59, Quan and Meng 2008:162).

33. CSPW (Changsha Polychrome Wares)

(cf. CSYKTZ 1996, Huang 2003, CSYBJWYH 2004)

Body type: stoneware **Origin: Changsha kilns**

Drawing: see Appendix 6-Drawing 17

Definition

The Changsha Kilns are famous for their underglazed painted stonewares, which were only common in the late Tang dynasty. Products can also be found dating to the Five Dynasties but at this time the Changsha kilns were in total decline. The Changsha kilns also produced celadon wares which are difficult to distinguish from low quality Guangdong celadon or Yuezhou celadon. However, an understanding of Changsha underglaze painting has been well-established from archaeological research at the Changsha kilns and from the Belitung shipwreck.

Detailed Description

Changsha products can be divided into two types: monochrome ceramics and polychrome underglazed painted wares. According to the archaeological excavation of the Changsha kilns, nearly 54% of Changsha products were monochrome wares, including celadon (42.2%), brown glazed wares (7.4%), white wares (1.5%) and green glazed wares (3%). Changsha underglazed painted ceramics account for 41%, consisting of underglazed monochrome painted wares (30.2 %) and the underglazed colourful painted wares (10.8 %). The remaining products were pottery and biscuit fired ceramics (CSYKTZ 1996:26-27). Only Changsha underglazed painted wares will be introduced in this section.

Glaze and body

Changsha underglazed painted stonewares have a transparent, thin and evenly applied glaze. Changsha bowls and plates have an un-glazed base and outside lower half. The interior of the bowls and plates are fully glazed. The underglaze painted patterns will be introduced later.

Changsha underglaze painted ceramics commonly have a lower to middle temperature fired stoneware body (1100-1200 ℃), which is slightly softer than Yue celadon and Xing white wares, although the Changsha kilns and Yue kilns basically used a similar clay which is grey and light grey (CSYKTZ 1996:24-25). Because of the un-balanced temperature and atmosphere in the dragon kilns (龙窑), the colour of the badly fired body was yellowish grey, whitish grey and dark grey. Changsha wares have a transparent greenish glaze which coated the colourful calligraphic and freely painted patterns produced with iron, copper and cobalt-oxide-based pigments. Because of the low quality clay of the Changsha wares, it was very common that before painting on the biscuit body, a white slip needed to be evenly applied which aimed to increase the hardness and whiteness of the clay (CSYKTZ 1996:24-27, Krahl 2010:56).

Shape and decoration

The shapes and decorations of Changsha wares were free and can be divided into a very complicated chorology: for example, ewers from the Lan'an Zui kiln sites (蓝岸嘴窑址) have eight types and 21 sub-types and jars have five types and eight sub-types. However, this can be simplified to the main principles that the jars and ewers followed. The ewers always have a short spout and a wide and high neck on a large and heavy body; a large handle is situated on the opposite side to the spout and two smaller handles flank the ewer. From the late Tang to the Five Dynasties period, the spout became much longer. Jars have a similar shape but without the spout and big handles, instead they normally have two small handles at either sides of the short and wide neck. Bowls have a short and straight or round body, with a short, bi-disc footring. The height is always equal to the diameter of the footring and the rim diameter is three times that of the footring. This shape accounts for nearly half of all the bowls produced (CSYKTZ 1996:50).

The most distinct feature of Changsha underglaze painted wares is the free calligraphic pattern, which is formed of leaves, flowers, birds, animals, fish, Chinese calligraphic inscriptions, Arabic inscriptions, and so forth. Appliqué figures, leaves and flowers were also very common and were applied to the bodies of ewers and jars which were coasted with the underglazed brown pigment. Most of the Changsha products were half glazed or not fully glazed, which presumably indicates that the wares were manufactured at high speed, in large quantities and at an economic cost on primitive production lines. Changsha wares were traded in very large quantities compared to Xing and Yue wares. For example, the Belitung shipwreck produced 55,000 pieces of Changsha bowls, while only 200 Yue celadon and 300 Xing white wares were recovered, which is testament to the capacity of the Changsha kilns for mass-manufacture for the foreign market (Krahl 2010:56-72).

Dating Evidence

Dating evidence for Changsha wares comes from both tombs and inscription dates carved on kiln tools and ceramics (Table 4.7). A group of trustable tombs are located in Zhenjiang city and provided several sets of Changsha wares, which can be dated to between 820 and 846 AD. Tomb M7 has a small Changsha jar and a tomb stele which records the date of 820 AD and Tomb M9 contains a Changsha ewer and dating evidence from the inscription on the gravestone shows 826 AD. A ewer from Tomb M10 can be attributed to the 834 AD according to the gravestone of Zheng, who was the occupant of the tomb, and Tomb M12 has another tomb stele which indicates that the unearthed Changsha small jar can be dated to 846 AD (ZJBWG 1985:133-146). Absolute dates were also carved on kiln tools and ceramics and record dates from 808 AD to 920 AD (CSYKTZ 1996:230-233, CSYBJWYH 2004:6).

No archaeological evidence from kiln sites and historical information has been found which can confirm the when the Changsha kilns commenced production, although they were flourishing during the late Tang dynasty according to the dating evidence presented above. During the first half of the 10th century, the quality of Changsha wares declined sharply and it is seldom to find Changsha ceramics still being used as burial objects at this time (CSYKTZ 1996:233).

Table 4.7: Dating evidence carved on kiln tools and ceramics.
(based on CSYKTZ 1996:230-233)

Kiln Tool	Ceramics	Inscription	Dating
Jar-Handle Mould	-	Yuan He San Nian	808 AD
-	Celadon Masher	Da He Wu Nian	831 AD
-	Bowl	Da He Liu Nian	832 AD
-	Bowl	Kai Cheng San Nian	838 AD
Mould	-	Hui Chang Liu Nian	846 AD
Jar-Handle Mould	-	Da Zhong Er Nian	848 AD
-	Bowl	Da Zhong Er Nian	848 AD
Mould	-	Da Zhong Wu Nian	851 AD
Jar-Handle Mould	-	Da Zhong Ba Nian	854 AD
-	Ewer	Da Zhong Jiu Nian	855 AD
-	Biscute Ware	Da Zhong Shi Nian	856 AD
-	Bowl	Da Zhong Shi Nian	856 AD
-	Ewer	Qian Ning Wu Nian	898 AD
-	Hand-Rest	Kai Ping San Nian	909 AD
-	Hand-Rest	Zhen Ming Liu Nian	920 AD

Two Changsha bowls found in the Belitung shipwreck also provide dating evidence. A bowl decorated with Arabic words has a carved mark near the footring, ‘Bao Li Er Nian Qi Yue Shi Liu Ri (the 16th of July in the second reign year of Bao Li, dated to 826 AD)’. Another bowl has a carved mark of ‘Bing Le (丙了, literally Third Finished)’ but it is difficult to understand the meaning of this mark. However, some scholars propose that this mark is a miss-writing of Bing Zi (丙子), which represents the year 856 AD, although it is also possible that this mark represents the year 796 AD)

(CSYBJWYH 2004, Krahl et al. 2010).

Distribution

Changsha wares were traded commonly in the western Indian Ocean. According to Table 6.7 in Appendix 5, there are 16 sites among 26 (519 sherds, 14.9% of total 3,479 sherds) that report the presence of Changsha polychrome stonewares. In particular, Mantai in Sri Lanka (Site 39), Siraf in Iran (Site 54) and Shanga and Manda in Kenya (Sites 110 and 112) all produce a large quantity. But their occurrence in the Red Sea, as well as in the Aden area, is relatively rare. For instance, only eight sherds of Changsha wares have been mentioned at Fustat in Egypt (Site 101).

34. JYBW (Jian-type Black Wares)

(cf. Koyama 1973, FJSBWG 1984, Li 1990, Li 1995a)

Body type: Stoneware **Origin: Jianyang kilns**

Drawing: see Appendix 6-Drawing 18: 6-9

Definition

In China during the Song dynasty kilns producing black glaze wares, especially tea drinking bowls, were widely distributed. Known black ware producers can be found in Fujian, Guangdong, Zhejiang, Jiangxi, Henan, Hebei and Shanxi Provinces (Koyama 1973:88). This class focuses on traded black wares to the western Indian Ocean, and attempts to introduce Fujian black ware producers, particular the Jianyang kilns (建阳窑).

Jianyang black wares (also called Jian black stonewares) were exported to the western Indian Ocean in very limited quantities. These ceramics are black glazed stoneware with iron-oxide black patterns. The only confirmed Jian-type black stoneware find was been reported in Sharmah and attributed to the 11th century (Zhao 2006:94-95). According to Bing Zhao, Jian black wares can be identified to the Jianyang kilns, which were famous for producing black wares with the so-called hare-fur pattern.

Detailed description

Jian wares have a rough stoneware body, which is hard and black, and the body is heavy and thick. The glaze is thick and normally black through successive firings, if not, the glaze is brown or reddish brown. The glaze normally has iron-oxide patterns in form of the so-called hare-fur pattern, which refers to many short and thin lines that are directed towards to the base (Figure 4.25). Jian drinking bowls normally have a small and short base, with a straight rim and a round body, although bowls with ex-turned rims and straight bodies are also found.

Figure 4.25: The hare-fur pattern of Jian black stoneware.
(Diameter: 125mm) (Koyama 1973:Figures 19, 20)

Dating evidence

Dating evidence for Jianyang bowls is mainly based on the excavations of Luhuaping kilns in Jianyang city, which suggested that they date to the Northern Song period (960-1127 AD) through the identification of coins and ceramic finds. No archaeological finds can be dated to the Southern Song period (1127-1274 AD) (FJSBWG 1984), and similar finds have also been identified at the Jishui kiln sites (吉水窑) in Jianyang city (Li 1990).

<u>35. GDPW (Guangdong polychrome wares)</u>

(cf. GZSWWGLWYH and AMOCUH 1987, Yang 1988)

Body type: Stoneware **Origin: Guangdong**

Drawing: see Appendix 6-Drawing 18: 1-5

Definition

After the decline of the Changsha kilns, exported polychromes sharply decreased during the 10th century. One example comes from a shipwreck and as can be seen from Table 3.6 and Figure 3.8 presented in Chapter 3, there was a sudden change in that the export of celadon wares to the Indian Ocean increased. Based on Dataset 3 in Appendix 3, a similar pattern has been seen and the only finds of polychrome wares were at the Sharmah site as reported by Bing Zhao. These polychrome wares can be attributed to Guangdong polychromes and their producers may have been the Xicun kilns and Haikang kilns (海康窑) (2006:93-94). In this section the aim is to introduce Guangdong polychrome wares based on archaeological reports of the Xicun and Haikang kilns.

Detailed description

Guangdong polychrome wares have a rough and porous body, which is light brown or greyish yellow. They have a yellowish green celadon glaze that has been high-fired and the fabrics of the body and glaze are hard. Rims are ex-turned, with a ground body. Three types of base can be found: a flat foot, footring and an ex-turned flat foot. The underglazed painted black patterns are normally in the form of floral and grass designs. Shapes include small plates, basins (or big bowls), cups, small vases, bowls, ewers, jars and boxes (GZSWWGLWYH and AMOCUH 1987:40-41, Zhao 2006:93-94).

Dating evidence

No strong and clear archaeological evidence can directly demonstrate the firing and manufacturing age of the Xicun and Haikang kilns. However, it has been suggested that they should be attributed to the Song period, according to the shapes of the ceramic wares (FPSM 1985:39-40, GZSWWGLWYH and AMOCUH 1987:66-67).

<u>36-37. CZBWW (Cizhou Black and White Ceramics)</u>

(cf. Qin and Ma 1990, Qin 2000b, Wang 2010)

Body type: stoneware **Origin: Cizhou kilns**

Drawing: None

Definitions

It was noted in the coarse white stonewares class (see CW II), that the Cizhou kilns mainly manufactured white stonewares in the early 11th century. In the 12th century, the Cizhou kilns created their own unique style of ceramics, which has been called the Cizhou type, and production lasted into the 14th century. This type refers to ceramic wares which have two layers of slip. The first white slip was applied to biscuit wares and was then covered with a black slip, which was incised and cut away before applying a transparent glaze (white and black Cizhou type) Another technique which was also popular utilised a single layer of white slip, which was incised and cut away, and covered with a transparent glaze or a green lead glaze.

Cizhou type ceramic wares were mainly produced in the Cizhou kilns located in Hebei Province. However, a large number of northern Chinese kilns located in Hebei, Henan and Shaanxi Provinces also imitated and copied Cizhou type wares.

Archaeological findings of Cizhou type ceramics in the western Indian Ocean are limited. Two main sub-types have been reported: incised white slip Cizhou type and the white and black Cizhou type.

Detailed Description

Body

Cizhou ceramics have a thick and heavy body, which is mainly grey, greyish brown and dark grey. The body fabric is much rougher than common quality stonewares and has been formed quickly and normally without any refining processes.

Slip and glaze

Cizhou ceramics are normally whitened by a thin white slip, which is milky in appearance. For black and white Cizhou type, a black slip was applied onto the sundried white slip. Designs were then incised on the black slip and cut away to expose the white slip. For the incised white slip Cizhou ceramics, the designs were directly carved onto the white slip. Therefore, the cutting area where the body is exposed was grey. The outside surface of bowls and plates are sometimes only half glazed.

Shapes and gecoration

The shapes mainly consist of bowls, plates, covered boxes, jars and vases, while the incised designs are normally flowers, floral scrolls, classical grass, fish and weeds, birds, dragons and phoenixes. Chinese characters, such as for good luck, can be commonly found. The incised patterns are freely and quickly carved, and look very rough. Normally, ceramic objects are fully decorated (Quan and Meng 2008:182-183).

Dating evidence

It is well known that the Cizhou kilns have a long history covering the period from the 11th to the 15th centuries (Quan and Meng 2008, Feng 2009). However, the typical Cizhou type occurred in the late 11th to the 12th centuries (Qin 2000a:2-4). In terms of traded Cizhou ceramics, it appears that trade continued until much later and maybe until the 14th century.

Due to political reasons, during the Jin period (1115-1234 AD), Cizhou type ceramics (except for Cizhou wares belonging to the CW II class) could not be easily transported to southern China. According to archaeological excavations, northern Chinese tombs dating to the Northern Song-Liao period (approximately the 10th to 12th centuries) have yielded Qingbai or celadon wares from the Yue, Longquan and southern Chinese kilns. However, in contrast, most Jin tombs dating from the 12th to 13th centuries mainly contain northern stonewares, such as from the Ding and Cizhou kilns, and there is an absence of any imported southern Chinese ceramics (Qin 2000b:33).

The political and dynastical changes which occurred in the 12th to 13th centuries separated northern and southern China and it was difficult to transport northern Chinese ceramics to the south. Therefore, there is a gap during the southern Song dynasty (1127-1274), when Cizhou kilns were at their peak (Qin 2000b, Quan and Meng 2008), when Cizhou ceramics were not available for trade to the western Indian Ocean. Therefore, traded Cizhou type ceramics can be dated to the Yuan period.

<u>38. JDZCWP (Jingdezhen Yuan copper-red and white porcelains)</u>

(cf. Cheng 2004, Harrison-Hall and Krahl 2009:54-55)

Body type: Porcelain **Origin: Jingdezhen kilns**

Drawing: None

Definitions

With the successful manufacturing of blue and white porcelain in the Jingdezhen kilns, similar techniques were attempted for firing copper pigment painted wares. It has been mentioned that the successful firing at high temperatures with copper-oxide pigment on good porcelain and underglazed-red designs is very difficult, as it is more volatile and harder to fire effectively compared to cobalt blue pigment (Harrison-Hall and Krahl 2009:54). The archaeological evidence for copper-red and white porcelains is very limited, both in China (Cheng 2004:43) and the western Indian Ocean. Only at the Gedi site in Kenya have sherds been found that could be re-constructed as an incomplete vase (Liu et al. 2012:47, 49). This discovery reveals that underglazed red porcelain wares were involved in the Chinese ceramic export trade in the second half of the 14th century.

Description

Body and glaze

As for JDZBW I-1 wares, Jingdehzne copper-red and white porcelains have a heavy, thick and white porcelain body. Sometimes the body is greyish and dark white. The unglazed base normally has an iron-black stain and the glaze is transparent with a slight bluish tinge; small bubbles can be found in the glaze. Another type of glaze seen is similar to Qingbai glaze (Cheng 2004:44).

Pigments and patterns

Copper oxide with successive firings may be bright red, but may fire pale, liverish red, grey or even black; the bright red colour is very rare (Cheng 2004:43, Harrison-Hall and Krahl 2009:54). The patterns mainly consist of floral designs, landscapes, animals and freely splashed patterns (Cheng 2004:43-44).

Shapes

The key shapes for copper-red and white porcelains are cups, vases and jars.

Dating evidence

Some wares have been found in a tomb at Fengcheng city in Jiangxi Province, which can be dated to 1338 AD (Yang and Wan 1981), while in Inner Monglia a vase was found in a pit in Wulan Chabu city, which has been attributed to the Yuan dynasty (Zhang 2008:188). In Gaoan city, a pit was found containing 67 porcelain pieces, which have been identified as Jingdezhen Yuan dynasty porcelains, together with 168 pieces of Longquan celadon wares which date to the 14th century (Liu and Xiong 1982).

4.4.6 Transport Jars Complex

The current understanding of Dusun and Martaban jars based on Chinese archaeological studies is scant, and neither of these names are Chinese. Tom Harrisson was the first to find and excavate Dusun jars, which were used as Dayak tributes by local head-hunters in Borneo (Harrisson 1949). Dusun jars were a type of poor quality celadon containers which was part of the Chinese trade ceramics during Tang dynasty and were made to carry other ceramic products or other products from China to the Indian Ocean (Figure 4.26: left). Dusun jars have been found at sites in the Indian Ocean in huge numbers (see Chapter 3), but in China, Dusun jars were simply common and poor quality jars for daily use or as burial objects. Similar jars have been found in Guangdong Province of China, which have a very rough dating range from the 5th to the 10th centuries. These were produced in the Guangdong local kilns. It should be noted that no good evidence can support the original kilns for the production of Dusun jars but it is highly possible that they came from the Guanchong kilns (官冲窑) in Xinhui County (新会县) and/or the Shiwan kilns in Guangdong Province of southern China. It also appears likely that other local kilns in Guangdong produced Dusun type jars.

Martaban jars are low quality glazed containers with a stoneware or high-fired pottery fabric (Figure 4.26: right and Figure 4.27). They probably had a similar function to Dusun jars. Their name comes from the Arabic pronunciation of a port located in Burma on the gulf of Pegu, called Martaban (Krahl 1986b:884, Harrison-Hall 2001:445). Moore has built a classification for Martaban jars according to excavated sites in Sarawak (Moore 1970). However, no parallel evidence can determine the accuracy of the original production site. Moreover, it can be confirmed that they were not made in Martaban and at least some come from Southern China (Horton et al. 1996:305).

Figure 4.26: Examples of transport jars.

A Dusun type celadon jar found at a site in Banbhore, Pakistan (left) (Khan 1969:40) and a Martaban jar, housed in the Topkapi Museum, Istanbul (right, height: 920mm) (Krahl 1986b:899).

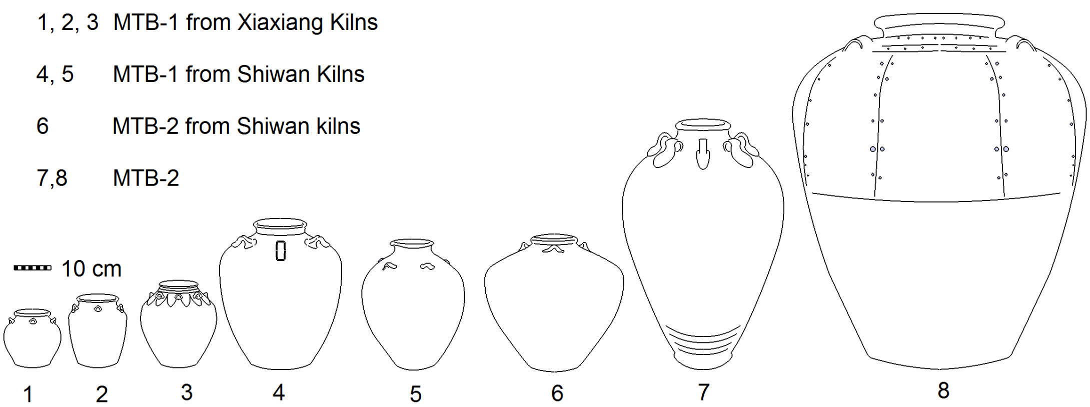


Figure 4.27: Principal shapes of Martaban jars.

(Drawing by Ran Zhang)

Martaban jars have a long history, which may begin during the Song dynasty (about 11th century) and lasted until the Qing dynasty (Horton et al. 1996:305, Valders 2000); therefore, they can be divided into two sub-classes. MTB I dates from the Song to the Yuan period (about age from the 11th century to 14th century). This type of jar was mainly fired in the Guangdong Province of China, where there is a tradition for producing transport containers (see the sub-class of Dusun jars). It appears that this class was fired in Guangdong in China, where the Shiwan kilns and Xiaxiang kilns (下乡窑) could be the potential sites of production. MTB II jars date to the Ming and Qing dynasties, and may have been produced in many places across southern China, such as the kilns located in the provinces of Zhejiang, Fujian and Guangdong (Harrison-Hall 2001:305).

This section aims to introduce these lower quality celadon/brown glazed coarse jars together with possible archaeological evidence from China. However, it should be clear that the understanding of these jars is still very limited.

39. DUSUN (early transport jars)

(cf. Liu 2000)

Body type: Stoneware **Origin: Southern China**

Drawing: see Appendix 6-Drawing 19: 1-11

Detailed Description

Glaze and body

Dusun celadon jars are very thin, greyish green or yellowish green, and have an unevenly applied glaze. Normally, the outer surface is half glazed and the inside is fully glazed. These jars have been fired at a lower temperature and the body is therefore loose, grey or whitish grey. Dusun jars have a heavy body and the inside of the jars are unpolished (rough surface).

Shape and decoration

Dusun jars come in various shapes and different sizes. Basically, they have a heavy shape with an unpolished flat base. Four or six lug handles are attached to the shoulder near the mouth, which is thick, straight, squared, rounded or projecting. Normally decorations are difficult to find but some marks, numbers or words in Chinese characters may be seen carved on the outer surface.

Manufacturing kilns

For many years the original production location of Dusun jars was uncertain. Professor Lin Meicun and his student, Miss Huang Ying, from Peking University, China (2013, personal communication), have suggested that a possible producer was the Guanchong kilns and the Gaoming kilns (高明窑) in Guangdong Province.

According to Xin Hui Xian Zhi (新会县志, the History of Xinhui County), the Guangchong kilns were located near the coast in the Xinhui area of Guangdong, which was a good geographical position for trading and transporting ceramics (Liu 2000). The Guanchong kilns mainly produced celadon wares for both daily use and the export trade. Shapes included bowls, plates, jars and basins. Based on the potters' names on the celadon wares, it is suggested that these ceramic products were not destined for the Tang central court as tribute ceramics. Instead they were a type of lower quality ceramics, not only because their body and glaze was of low quality but also because no private names were allowed being on tribute ceramics in ancient China. No archaeological dating evidence has been found at the kiln site and no historical documents suggest a date. However, based on similar type celadon wares unearthed from Tang tombs, the suggested date of Guangchong kiln is roughly from the 8th to the 10th centuries AD (Liu 2000).

In Guangdong Province, the Gaoming kilns and the Chaozhou kilns also produced similar jars. The jars from the Chaozhou kilns were mainly for the domestic market but may also have been for export. The Meixian kilns in Guangdong were firing similar containers but these has a small crazed, thicker and evenly applied glaze, which is a feature of a better quality product (based on the evenly applied glaze and well controlled glaze colour). Therefore, the Meixian kilns might be not be the Dusun producer (Yang and Cui 1993, Yang 1994, Huang 2014). Similar shape jars have been found at the Jiangkou kilns (将口窑) located in Jianyang County in Fujian Province, but these have a different glaze, which it evenly applied, thicker and bluish green or yellowish green with small crazes (Yang 1990:137).

There is a kiln site report of the Yudu kilns (于都窑) in south Jiangxi, not far from Guangdong Province. This states that lugged celadon jars were produced in local kilns during the 8th to 10th centuries (Wan 1987). Local archaeologists found links between these jars and Tang Chinese finds from the Paracel Islands in the South China Sea (GDSBWG 1974), and confirmed that they were similar (Wan 1987:545).

In southern Jiangxi province, kiln sites at the Dayu (大余窑址) and Huichang kilns (会昌窑址) may also have been the producers of coarse celadon wares similar to the jars manufactured at the Yudu kilns (Chi 1984, Xia 1984, Wan 1987:544). However, according to the published photos and information, there is not confirmation that these were Dusun-ware producers. No reports mention jars (including from the Yudu kilns) that can be directly linked to Dusun jars.

Dating evidence

According to Table 4.8, the earliest clue relating to celadon jars which are similar to Dusun wares, comes from tombs in Guangzhou City in Guangdong Province, and these are dated to the late eastern Han dynasty (about the 2nd century AD) (GZSWWGLWYH 1981:398-399, Huang 2014:4). One tomb can be dated as 'Jian Xing Yuan Nian (313 AD)' and a tomb in the Chituling area of Shixing County is dated as 'Jian Yuan Er Nian (343 AD)' (GDSWGH 1955, GDSBWG 1982).

Table 4.8: Key dating evidence for Dusun wares.

Tomb Locations	Dating Evidence	Dating	Reference
Jieyang	tomb bricks	460 AD & ~7th cent.	(Yang and Chen 1984)
Yingde and Lianyang	tomb bricks, Sasanian coins	497 & 499 AD	(Yang 1961)
Yingde County	coins	~ 8th cent.	(Xu 1963)
Baidian County	tombstone	697 AD	(Yang 1986)

During the period from the Northern and Southern Dynasties to the Tang period, celadon jars can be found in tombs much more commonly. The tombs, celadon findings and dating evidence are listed in Table 4.8.

Dusun jars have also been found in the Belitung shipwreck, which can be dated to the late Tang period based on the inscription on a bronze mirror and other datable bowls (Wilson and Flecker 2010:35-37).

The shape, body and glaze of Dusun jars did not change much over this long period. The current understanding of dating of Dusun jars is therefore scant, but they roughly date from the 4^{th} to the 10^{th} centuries and were traded as containers in the Indian Ocean starting maybe in the 8^{th} to 9^{th} centuries.

Key identification points

Dusun jars have a flat base with a heavy body, and four or six handles near the mouth are present. The outer surface is normally half-glazed and the glaze is in various greenish colours, such as yellowish green, greyish green and brownish green. The glaze is very thin, and poorly and quickly applied. The clay body of Dusun jars is heavy, thick and loose. Decorations are very rare, although occasionally the potters' name may be seen.

Distribution:

The distribution of Dusun wares in the western Indian Ocean is very wide and common, with a huge number of finds. According to Table 6.7 in Appendix 5 (column BG: Dusun), 18 among 26 sites produced 1,827 sherds and it makes over 50% of all Chinese ceramic finds of this period (3,479 sherds). Particularly at the sites of Mantai in Sri Lanka (Site 39), Siraf in Iran (Site 54), Sohar in Oman (Site 79), Athar in Saudi Arab (Site 83), Sharmah in Yemen (Site 94) and Manda in Kenya (Site 112) produced a large number of Dusun sherds.

<u>40. MTB I (Transport Jars)</u>

(cf. Chen 1978, Wu and Da 2003)

Body type: Stoneware **Origin: Southern China**

Drawing: see Appendix 6-Drawing 19: 12-19

Definition

This is a group of lower quality coarse stoneware jars with a black-gritted, grey body, which is coated with a finely crazed, dark olive-green glaze. The interior is normally fully glazed and the exterior half glazed. The unglazed area (except the base) is normally fully or partly iron-red stained.

The shape of the jars normally has a rolled or wide and thick rim, and the base is coarse and flat. Four or six lugs, positioned vertically or horizontally, are applied to the shoulder. Decorations are rarely found, only a carved floral pattern on the shoulder. Moulded and squared marks with Chinese characters, including the potter's names, reign names and auspicious words (normally two to four characters) may be seen on the shoulder. The height of the jars varies from about 10cm to 40cm.

Dating and possible original kilns of MTB I wares

Martaban jars in this class were probably produced in Guangdong Province, in two kilns; the Shiwan kilns (Chen 1978) and Xiaxiang kilns (Wu and Da 2003) are highly possible. Both these kilns roughly date from the Song to the Yuan period. In general, it is rare to find archaeological dating evidence on Martaban jars and there are only two absolute dating proofs from the Shiwan kiln site in Guangdong Province. One sherd has a moulded reign mark of Zheng He Liu Nian (政和六年, the sixth year of the Zheng He reign) which can be dated to 1116 AD, and a second Otherwise, one piece has the Jiayou (嘉祐) reign mark, which can be dated to 1056 to 1063 AD (Figure 4.28). According to a survey and excavation at Shiwan kiln, the firing of this class of coarse jar was popular during the Song dynasty and started to decline during the Yuan dynasty (about 13th to 14th century). By the time of the Ming dynasty the Shiwan kilns had entered their heyday for firing ceramics (Chen 1978:197). Similar products were fired in the Xiaxiang kilns, but there is no archaeological dating proof, only chronological and typological shapes suggest that they are coarse jars dating to the Song dynasty (Wu and Da 2003:24).

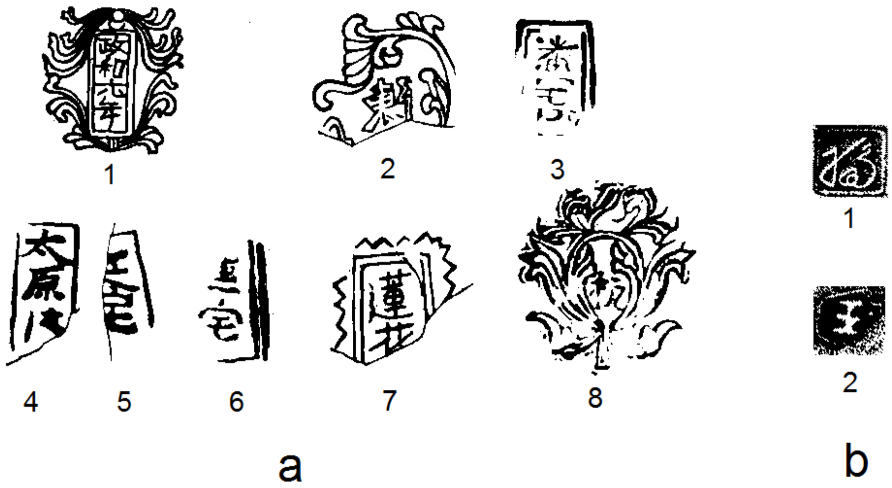


Figure 4.28: Marks on Martaban wares.

Group a= MTB I (a-1: dating marks; a-2, 3: potter's names; a-5-7: auspicious words; a-8: applied decorations), group b=MTB II (b-1: Fu; b-2: Yu)

(Drawing by Ran Zhang)

Archaeological dating proof from Indian Ocean sites support Martaban type jars occurring with Yue celadon from about the 11th century, after being unearthed in southeast Aisa and Kish in the Gulf (McKinnon 1979, Whitehouse 1983). A similar group to this class occurs in al-Mataf from Phase II, suggesting that it was popular from the 14th century to as late at the early 17th century when the site was abandoned (Kennet 2004, Priestman 2005:50). In Kenya, some sherds have been found with Yuan and early Ming blue and white porcelain dating to the 14th century, which have been identified as Shiwan productions from Guangdong. One sherd has a squared mark of 'Shi Xin (时新, New Fashion)', and in the Williamson collection there is a sherd with the squared mark of 'Qing Xiang (清香, Pleasant Smell)' (Priestman 2005:305, Liu et al. 2012:45). This feature could go back to the 11th century but it seems likely that it continued to be used into the 14th century (Figure 4.28).

Therefore, it can be seen that this type of jar was popular from the 11th to the 14th centuries and dating may extended from the 11th to the 17th centuries. It should be noted that during the Yuan dynasty, the firing of Martaban jars in Guangdong gradually decreased, and after this time (approximately the late 14th century), Martaban jars began to moving into the next class (MTB II).

41. MTB II (Late Transport Jars)

(cf. Van Der Pijl-Ketel 1982)

Body type: Stoneware **Origin: Southern China**

Drawing: see Appendix 6-Drawing 19: 20

Description

MTB II is a class of transport containers of low quality with celadon or lead glazes in olive green, chocolate brown and iron black. This class can be roughly dated to the Ming to Qing dynasties (15th to 19th centuries). It has very similar fabrics for the body and glaze to MTB I wares. The lower part of the outside surface is normally unglazed with spanning-ribbing like marks. The ribbing marks can also be found on the interior. There are three features known about this class: 1) Martaban jars became much larger (normally from 35 to 90cm); 2) carved decorations were applied to the body rather than only on the shoulder; 3) the shape is high with a relatively smaller base and a high shoulder.

Dating and possible original manufacturing locations

MTB II wares were popular in the Indian Ocean from the period from the 15th to the 19th centuries. Spot dating proof comes from the shipwrecks of Santo Antonio de Tanna and Witte Leeuw (Van Der Pijl-Ketel 1982, Piercy et al. 1992, Chandima 2006:99). It can also be found in many other places, such as south-east Asia, Sri Lanka, the Gulf, East Africa and so forth (Taha 1983, Kennet 1994, Horton et al. 1996, Priestman 2005). Horton states that these jars continued to reach East Africa until the 19th century (Horton et al. 1996:305). However, Wang Guangyao from the Palace Museum of China has highlighted that care should be taken when dating some MTB II jars, as they could only have been produced during the 15th to 17th centuries (2014, personal communication).

The location of MTB II production is uncertain, and they may come from the Far East and south east Asian countries, such as China, Vietnam, Thailand and Cambodia (Van Der Pijl-Ketel 1982:220-221). Some personal communications with Chinese scholars have been made: Feng Xiaoqi from the Palace Museum and her student Wu

Ning have suggested that these jars were fired in southern China and a possible producer may have been located in Quanzhou city in Fujian, but this is very uncertain because no archaeological evidence can support this assumption (Feng 2012). Wang Guangyao provides a similar identification and noted that the large size and black glaze jars with boss-and-line decorations were ‘a kind of southern Chinese made jars’, which may also have come from Vietnam and Thailand. Chinese made jars have a better and thicker quality of glaze and the body is refined (Wang 2014a). Therefore, it can be seen that both the local kilns in both Guangdong and Fujian were probably producers, but current understanding of these kilns and their iron-brown or black glazed wares is weak.

The Witte Leeuw shipwreck (dated to 1613) yielded a group of Martanbani jars and the type of jars should be noted. This type is normally of a smaller size with a height from 30 to 40 cm. The shape is similar to Shiwan jars in MTB I, but has a high shoulder and near the shoulder there is a moulded and squared mark, normally with one character, such as ‘Fu (福 Luck)’ or ‘Yu (玉 Jade)’. This decoration may have developed from the squared marks in MTB I. The Chinese characters used in the marks indicate that this type of jar may have come from China (Van Der Pijl-Ketel 1982).

In general, we have no more information about this class and the descriptions and datings are very uncertain (Horton et al. 1996:305, Harrison-Hall 2001:447-448, Kennet 2004:50, Priestman 2005:304-305).

4.5 Conclusion of Chapter 4

This chapter has introduced 41 classes of Chinese trade ceramics that can be divided into six complexes. Based on the overview of Chinese ceramic history and industries presented in Chapter 2 and the dataset collections of Chinese ceramic finds from the western Indian Ocean presented in Chapter 3, this classification has attempted to provide a systematic and comprehensive classification of Chinese ceramic materials with clear and precise definitions that can be used by archaeologists working on fragmentary assemblages. The dating evidence has been presented as fully as possible allowing scholars to evaluate this against the evidence from their own sites. Although much remains to be done to this classification before it can be called complete, it is hoped that what has been produced here will be a useful contribution to further research and will allow a more standardised and comparable approach to be taken by scholars working in the region.

It is also hoped that this classification will allow quantitative comparisons to be made between assemblages from different sites, in order to help interpret distribution patterns in Chinese ceramic finds in the western Indian Ocean. In order for quantified comparisons between sites – and also between different phases at the same site - to be possible, it is of course important that the assemblages to be compared are classified according to the same system.

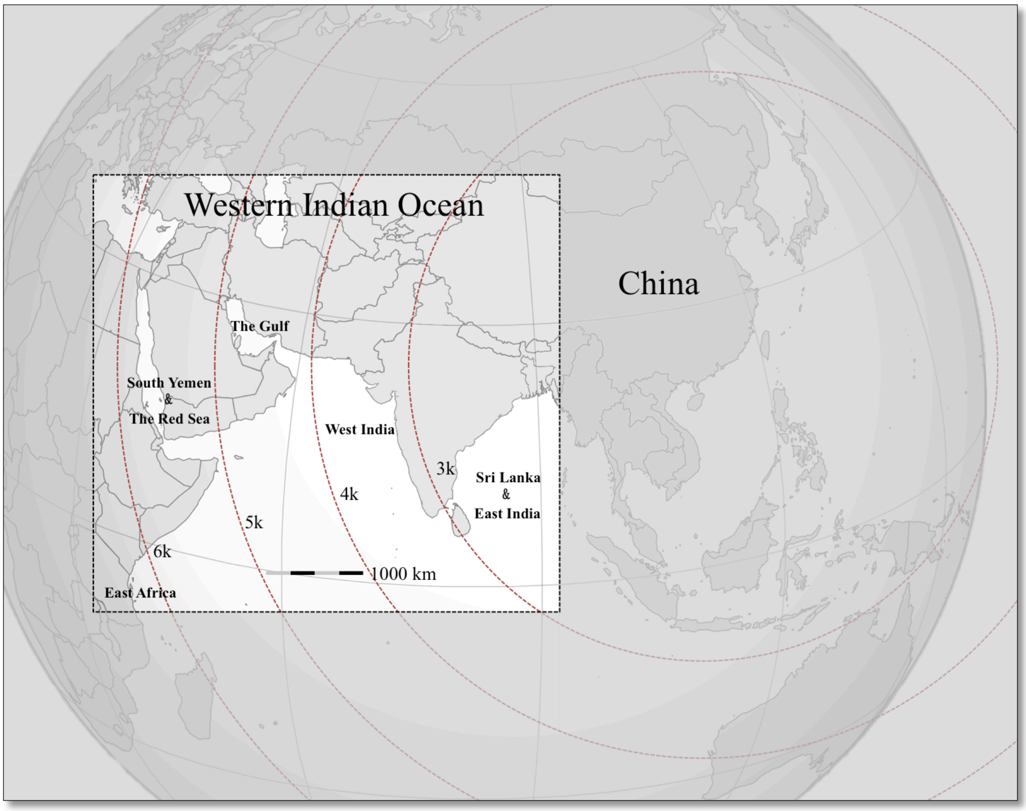
CHAPTER 5: A RE-CONSIDERATION OF THE CHINESE TRADE CERAMIC INDUSTRIES AND THEIR EXPORTS TO THE WESTERN INDIAN OCEAN, FROM THE 8TH TO THE 15TH CENTURIES

5.1 Introduction

In previous chapters, a revised standardised and systematic classification of Chinese ceramics imported to the western Indian Ocean was presented. Supported by evidence from both archaeological research in China, particularly on kiln industries and Chinese ceramic findings from the western Indian Ocean sites, this classification attempts to cover the full range of Chinese traded productions to a very wide geographical area including India, the Gulf, the Red Sea and East Africa. This classification also attempts to bridge the gap in archaeological scholarship between Chinese archaeology and western Indian Ocean archaeology, which is often caused by language, by combining evidence from both areas together, particularly dating evidence and production evidence. It is hoped that this classification will be a useful step towards helping to clarify the patterns of Chinese ceramic trade with the western Indian Ocean before the 16th century.

Based on this classification and the related analyses in Chapters 2 and 3, this chapter aims to provide a more general discussion of the changes in the Chinese trade ceramic industries and their exports to the western Indian Ocean. Using Datasets 1 to 3 (see Appendices), this chapter attempts a further exploration of the changing trends in Chinese trade ceramics from the perspectives of both China and the western Indian Ocean. This chapter is divided into four chronological sections following the periods used in the conclusion to Chapter 2. Each section will discuss the Chinese trade ceramics industries in China and how developments there might be related to trade patterns in the western Indian Ocean based on the distributions and quantifications of sherds and sites in the western Indian Ocean.

From the southern Chinese littoral area, where the traded ceramic industries and trading ports were located, the trading distance to the western Indian Ocean has been divided by approximately every 1,000 kilometres on Map 5.1. These distances are indicative only and measure kilometres from the kiln sites 'as the crow flies' rather than taking into account different mechanisms of trade across land or by sea. They are designed only to give a visual impression of increasing distance.



Map 5.1: Distance division of trades from southern China to the western Indian Ocean.
(Drawing by Ran Zhang)

5.2 Chinese Ceramic Industries and their Trade Patterns in the western Indian Ocean

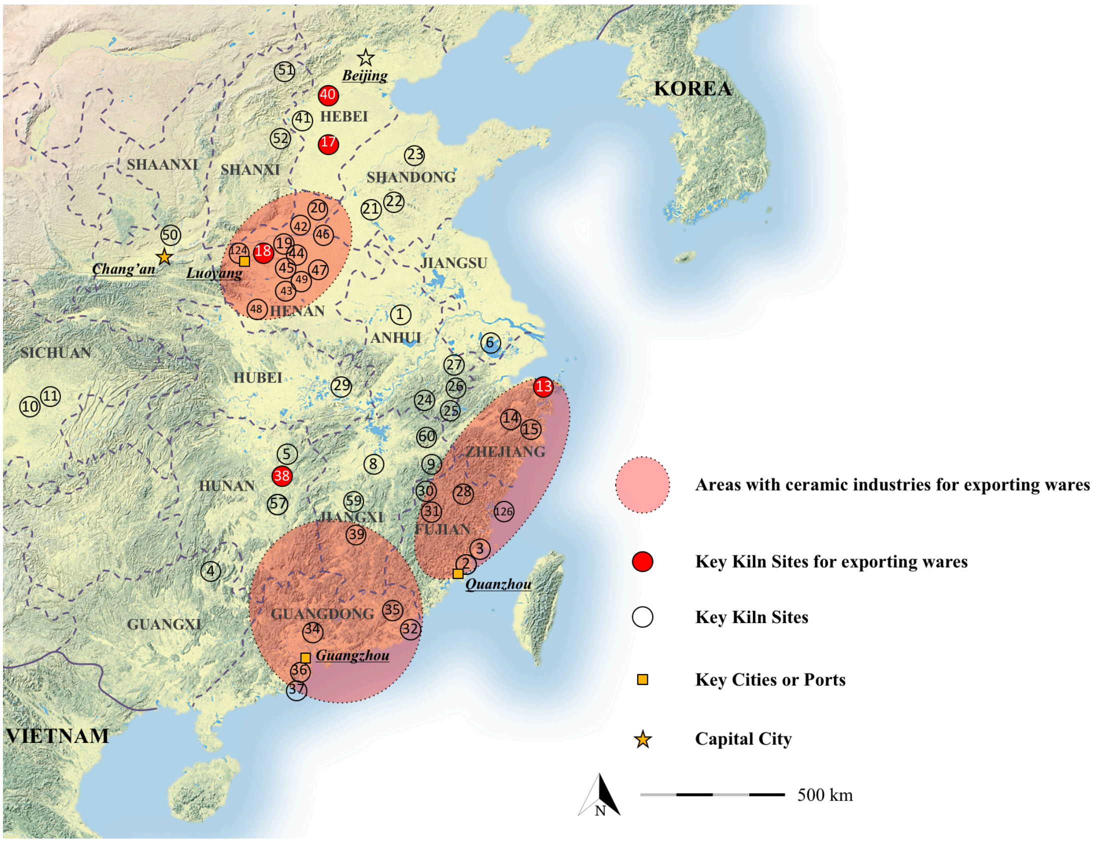
The Islamic and Asian states saw a great change in both political and economic perspectives in the 7^{th} to 8^{th} centuries. The unification of the Near East under Islam and China ruled by the Tang dynasty provided wealth and stability that gave a new impetus to long-distance trade. The land-based routes had seen their golden age before the middle of 8th century (Lin and Zhang in press). Due to the decline in trade via land routes, as well as political and military instability in central Asia (e.g., the Battle of Talas and the An Lushan Rebellion), maritime trade became increasingly important for the Tang Chinese court, and the economic centre of China switched from north to south. Consequently, the port cities in southern China grew in size and importance and large-scale maritime trade from China to the Persian Gulf via the Indian Ocean started in about AD 800 (Whitehouse and Williamson 1973). At this time, for the first time archaeological evidence of Chinese ceramics in the western Indian Ocean is found.

5.2.1 Period 1: Early Chinese Ceramics Trades (c. 750-1000 AD)

Period 1 represents the era of Chinese ceramics being imported to the western Indian Ocean in large quantities (see Chapter 3). The ceramic industries of late Tang China were booming in comparison with prior periods. Good quality wares, such as the white stoneware produced in the Xing kilns and celadon produced in the Yue kilns, were highly prized as not only ideal cups for the tea-ceremony (Lu 1927:Chapter 4, Wang 2004c:28-29, Krahl et al. 2010:46), but also tribute wares for the Tang central palace and court (Wang 2004c:28-29). Good quality ceramic wares were therefore involved in maritime trade with other luxury commodities such as silk, spice, glass and metal works.

As shown in Table 6.7 in Appendix 5, not only high quality wares were traded, but also coarse wares such as Dusun transport jars, and common quality ceramic wares such as Changsha polychrome wares. These lower quality ceramics were traded in much higher quantities in comparison with the high quality ceramics according to the figures that are available in this table.

Map 5.2 shows the locations of the kilns where traded ceramic wares were produced. The pink areas and red-coloured sites on this map show the trade ceramic producers and industries. This is according to the ceramic classes dated from 618-907 AD in the classification of Chapter IV (see Table 4.2-1 and classes 1, 2, 20, 21, 23, 26, 32, 33 and 39 for detailed information in Chapter IV). These kilns and their wares have been reliably identified. The pink and dotted circles cover the areas of the ceramic industries and the kilns in these areas are those thought to have produced exported ceramic wares. It can be seen that the exporting ceramic industries were distributed in both north and south China and were in the areas of Henan, Hebei, Guangdong, Fujian and Zhejiang provinces.

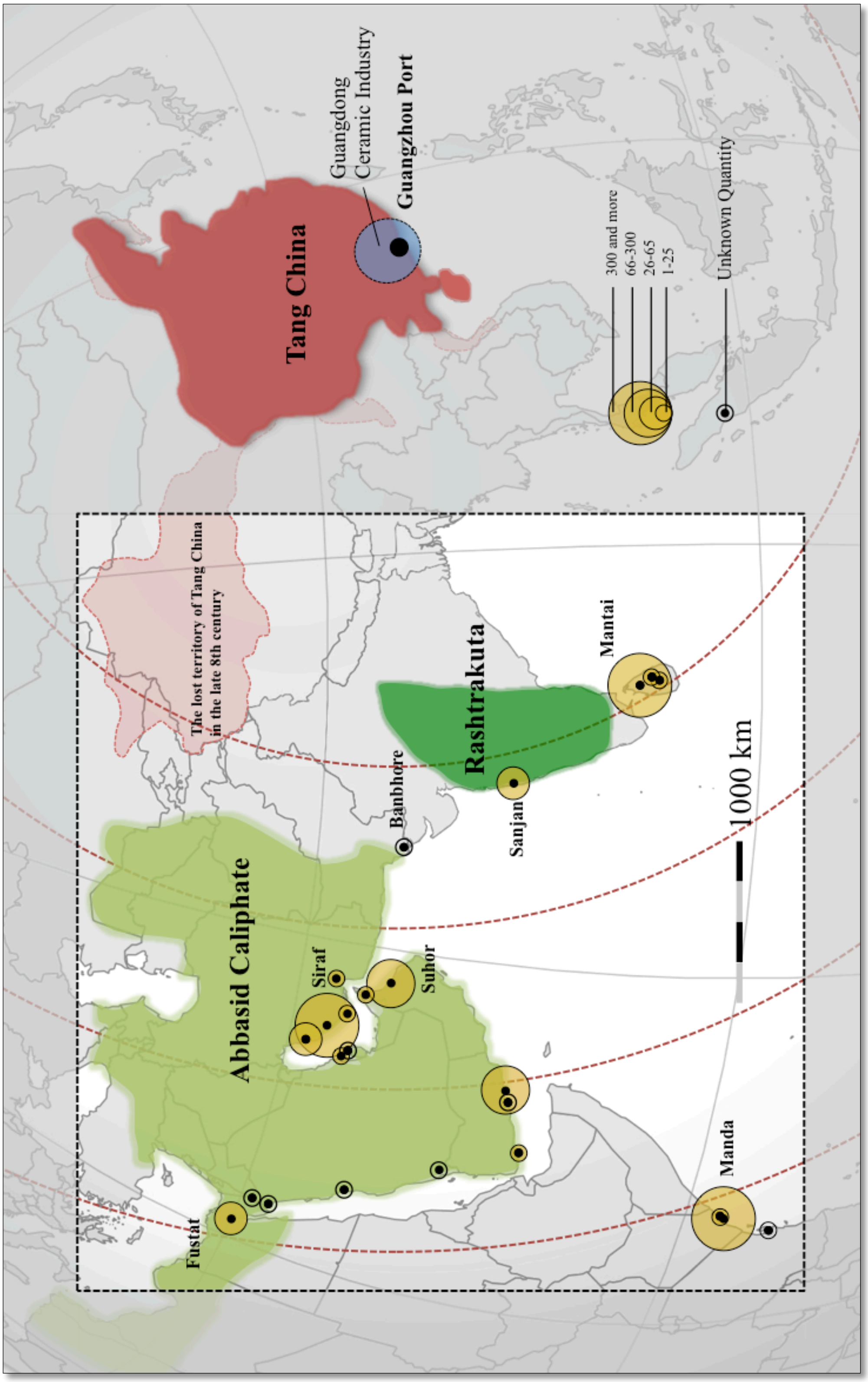


Map 5.2: Distribution map of Chinese ceramic kilns for export wares (Period 1).
(Drawing by Ran Zhang)

As Table 6.7 indicates, the Dusun transport coarse wares made up the largest proportion of trade ceramics to the western Indian Ocean during this period, which suggests that they were produced in Guangdong province (see Chapter 4: Transport Jars/Wares). There were also significant numbers of Guangdong celadon imitations traded. This could suggest that Guangdong formed a trading ceramics industry at this time, particularly for producing these low quality transport jars and wares for maritime trade. The prosperity of the Guangdong export ceramic industry could be because Guangzhou port was in an advantageous position for maritime trade.

The practice of maritime trade with transport jars can be traced back to the Uluburun shipwreck in the Mediterranean as early as in the 14th century BC (Delgado 1998:see 'Uluburun') and it is believed that this practice played an important role in the sea-route trade in the Indian Ocean as well, for which the evidence comes mainly from the Belitung shipwreck (Krahl et al. 2010, Huang 2016). The requirement for coarse but high-fired ceramic containers links to the practice of maritime trade in the Indian Ocean and also suggests that Guangzhou port might have been one of the key areas in the trade between China and the Gulf. Behind Guangzhou port there was a large ceramic industry of these transport coarse wares involved in Guangdong and south Jiangxi provinces.

The Chinese ceramic finds and their quantities from the western Indian Ocean dated to the 8th to 10th centuries are shown on Map 5.3. It is interesting to see that based on the distribution of archaeological sites with Chinese ceramic findings, they are mainly located in the area related to trade with Basra and the Abbasid Caliphate, in particular in the area of the Gulf. Although in the area of Sri Lanka has only three sites, there is a relatively high sherd quantity in Mantai site (Site 39). The sites along the Yemeni coast to Eastern Africa have a higher sherd number as well but the same situation is not seen in the Red Sea.



Map 5.3: Distribution of sites with Chinese ceramic sherd quantities (shown by yellow circles) in the western Indian Ocean (Period 1).

(This map is based on Table 5.1 and see the site locations on Map 1.2 in Chapter I, drawing by Ran Zhang)

This pattern can be seen more clearly in Table 5.1 and Figure 5.1 which show that the high sherd numbers in Sri Lanka are due to Mantai, whilst the other two sites only have small quantities of Chinese ceramic finds. This may indicate that Mantai was a re-export port city of Chinese ceramics but that the local consumption/use of Chinese wares in Sri Lanka was very limited, as is suggested by the limited number of sites with Chinese ceramic finds. In the area of west India there is a very poor distribution of both sites and sherds. The only well-known Chinese ceramic materials come from Sanjan (Site 34). But with just about 30 sherds, it does not present the pattern of Chinese ceramic trade clearly. Both the Gulf and the Red Sea have a large number of sites with Chinese ceramics (nine and eight sites respectively, as shown in Table 5.1 and Map 5.3) and although these sites were in the territory of the Abbasid Caliphate, the Gulf has a much high percentage of the total sherd quantity (20%) in comparison with the area of Yemen and the Red Sea (8%). The sites of Sohar (Site 79) and Siraf (Site 54) were two key trading centres in the Gulf area and the local consumption of Chinese ceramics was rich, as indicated by the distributions of site and sherd numbers. Al-Sharmah (Site 94) is the only site with a large quantity of sherds in Yemen but most is Dusun coarse wares. The consumption of common and good quality classes in this site is poor (Table 6.7 in Appendix 5). Shanga and Manda in Kenya (Sites 110 and 108) could indicate that there was a large quantity of Chinese ceramic imports in East Africa but they also have a large percentage of Dusun coarse wares. The Changsha polychrome wares and Yue celadon wares were relatively limited (Table 6.7).

Table 5.1: This table presents the site list in the areas in western Indian Ocean that divided by trade distances of every 1,000 km from south China (Period 1).

*This table is based on Table 6.7 in Appendix 5. The site names can be found in Dataset 3 of Appendix 3 according to site numbers. There are five areas (Sri Lanka & East India, West India, The Gulf, Yemen and the Red Sea, and East Africa) in this table. In each area, the site with Chinese ceramic findings and their sherd quantities have been listed below. 'SN' means 'Site Number', which can be found in Appendix 3, 'SQ' means 'sherd quantity' and '✓' represents 'unknown sherd number'. At the bottom, the '**Total Quantity**' shows the total numbers of site and sherd quantity in each area.*

Area	**Sri Lanka & East India**		**West India**		**The Gulf**		**Yemen and the Red Sea**		**East Africa**	
	SN	SQ	SN	SQ	SN	SQ	SN	SQ	SN	SQ
Site List	Site 39	**2172**	Site 34	34	Site 52	23	Site 82	✓	Site 110	30
	Site 45	10	Site 51	✓	Site 54	356	Site 83	✓	Site 112	196
	Site 48	21			Site 55	29	Site 86	✓	Site 113	✓
					Site 56	3	Site 90	✓		
					Site 62	✓	Site 91	✓		
					Site 67	2	Site 93	✓		
					Site 79	270	Site 94	251		
					Site 97	4	Site 101	38		
					Site 123	38				
					Site 129	2				
Total Quantity	3	2203	2	34	10	727	8	289	3	226

	Sri Lanka	India	The Gulf	The Red Sea	East Africa	Total$_1$
Site No.	3	2	10	8	3	26
%	11.5%	7.7%	38.5%	30.8%	11.5%	100.0%
Sherd No.	2203	34	727	289	226	3479
%	63.3%	1.0%	20.9%	8.3%	6.5%	100.0%

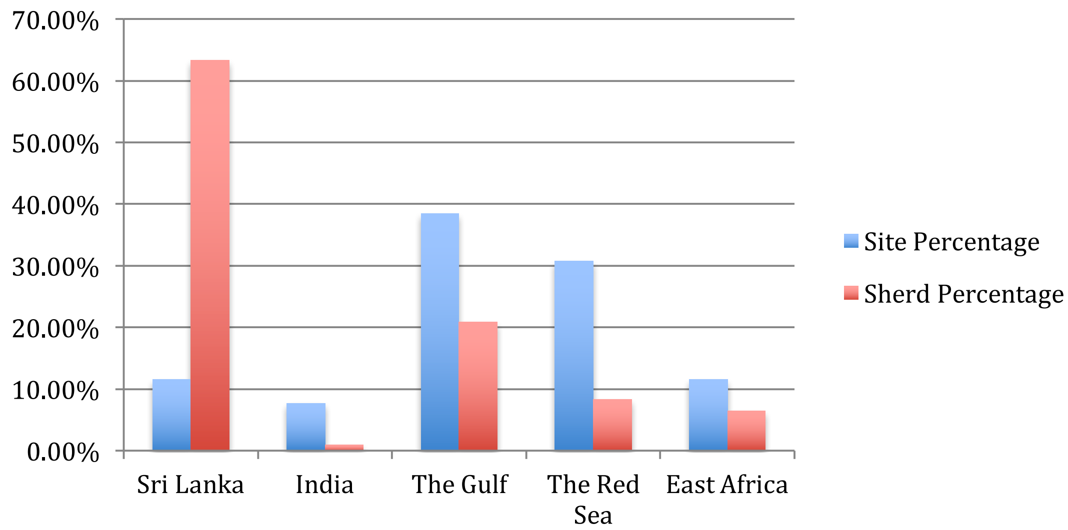


Figure 5.1: Site and sherd quantity percentage in five areas.

Total$_1$ in the table represents the total numbers of site and sherds in the western Indian Ocean (Period 1, sources based on Table 5.1)

Based on the descriptions above, it can be suggested that the Abbasid Caliphate was clearly the key focus of trade from Guangzhou port in southern China and the Gulf was the centre of Chinese ceramic trade at this time. Along this long maritime route from China to the Near East, Mantai can perhaps be suggested to have been a middleman. When Chinese ceramics arrived in the Gulf, further trade did reach Yemen but then does not appear to have travelled to the Red Sea in large quantities. But it should be noticed that there might be an archaeological weakness in this area, due to detailed information of Chinese ceramic finds that are unclear in sites of Oman, Saudi Arabia and Yemen. East Africa appears to have been a sub-trade zone of the Gulf because there is a relatively low distribution but a certain presence of Chinese ceramic finds at the sites of Manda, Shanga and Unguja Ukuu.

5.2.2 Period 2: Chinese Ceramics Trades in the Transitional Era (c. 1000-1250 AD)

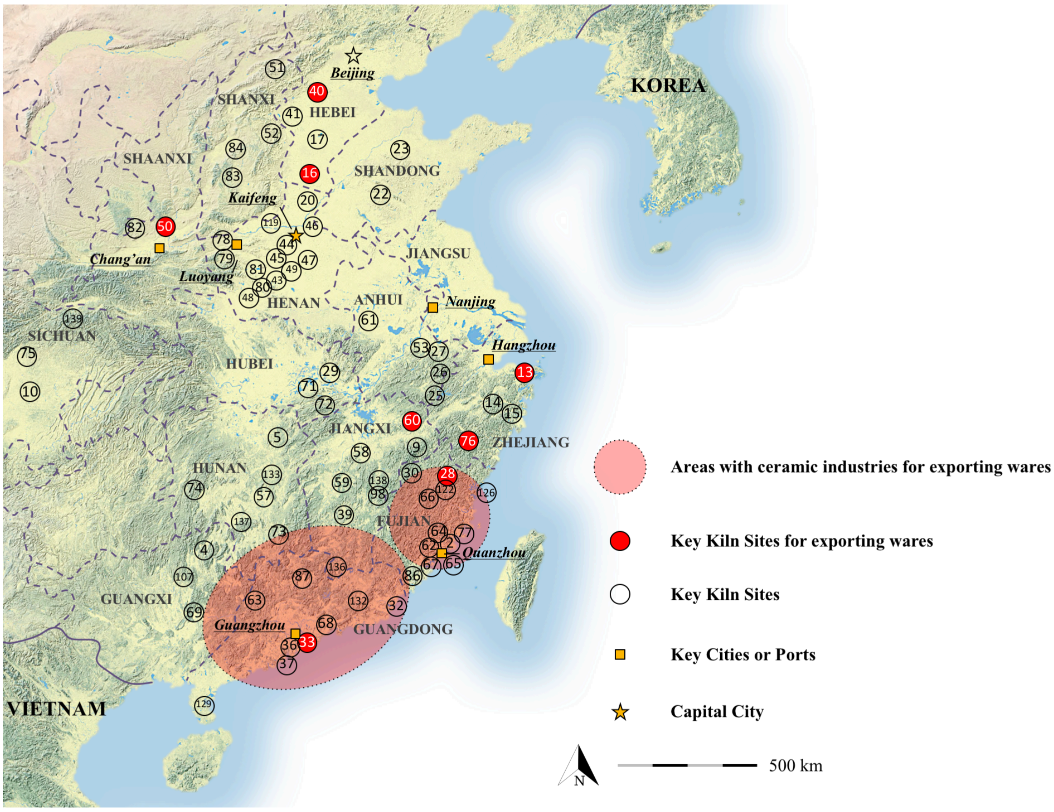
The end of the Tang Empire in the early 10th century divided China into different states until the Song Empire re-unified it in the early 11th century. At the same time the prosperity of the Abbasid Caliphate began to decline and this perhaps reduced long distance trade between China and the Gulf. Period 2 therefore sees a change towards Oman, Aden and particularly Fatimid Egypt as the key trading partner (Chaudhuri 1985:49, Rougeulle 1996:167-171).

In comparison with Period 1, it seems that the Chinese ceramic findings in Period 2 have obvious limitations. First, there is the decreased quantity of sherds (Table 3.5 in Chapter 3) and un-balanced distribution. Chinese ceramic findings from Sharmah (Site 94) and Fustat (Site 101) account for nearly 80% percent of all Chinese ceramic materials (Table 6.8 in Appendix 5) and 15 sites have no reported sherd numbers. This might be related to the second limitation, which is that the understanding of Chinese trade ceramics from the 11th to 13th centuries is still relatively weak.

This is not hard to explain because the Chinese trade ceramics of Period 2 consist of white stoneware and Qingbai wares. These white/bluish white ceramic wares were produced in south China, in areas such as Fujian, Guangdong and Anhui provinces and cannot be easily distinguished. This may be a part of the reason for the low reported numbers of Chinese ceramic sherds at many sites in the 11th to 13th centuries.

In terms of Chinese ceramic archaeology, the understanding of Chinese ceramic industries in this period is well established by contrast (Chapter 2).

According to the ceramic classes dated from 907 to 1271 AD in Table 4.2-1 in Chapter 4 (see classes 3 to 8, 14 to 15, 22, 24, 25 34 to 36 and 40 in Chapter 4), Map 5.4 shows the trade ceramic industries from the 10th to 13th centuries. There were some changes in manufacturing location according to this map.

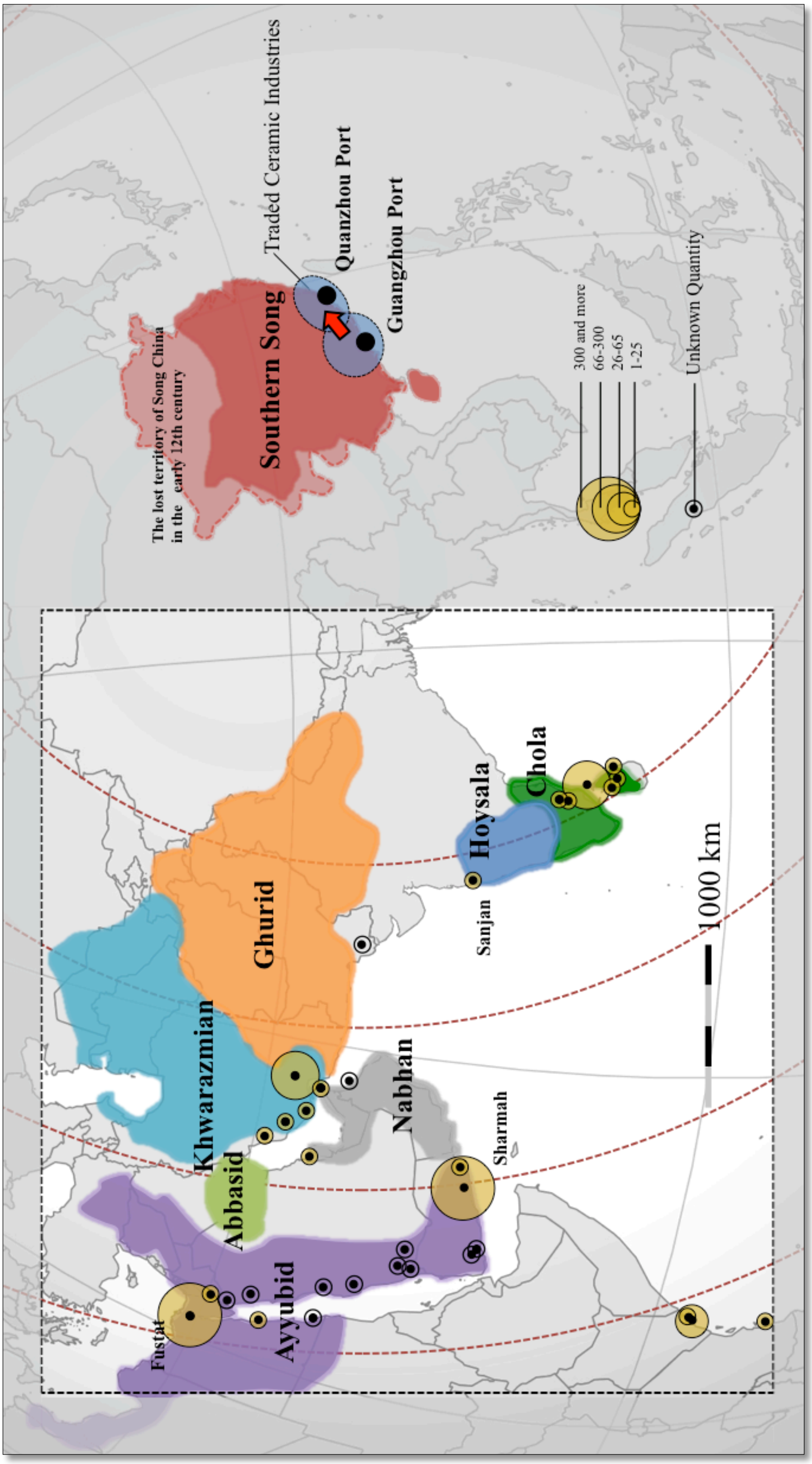


Map 5.4-1: Chinese traded ceramic industries in the 11th to early 12th centuries

Map 5.4-1: Chinese traded ceramic industries in the late 12th to the 13th centuries

Map 5.4: Distribution maps of Chinese ceramic kilns for export wares (Period 2).

(Drawing by Ran Zhang)



Map 5.5: Distribution of sites with Chinese ceramic sherd quantities (shown by yellow circles) in the western Indian Ocean (Period 2).

(This map is based on Table 5.2 and see the site locations on Map 1.2 in Chapter I, drawing by Ran Zhang)

Firstly, the industries had shifted to south China and this shift occurred in the middle of the 12th century when Song China lost the northern Chinese territory in 1127 AD. No northern Chinese ceramic production could access the maritime trade via the southern Chinese port cities. Secondly, with the decline of Guangzhou port and the rise of Quanzhou port, the traded ceramic industry established in the 8th century and originally located in Guangdong province following this change of port cities. It can be seen clearly that, in the 13th century, a large traded ceramic industry was centred in Fujian and could reach the areas of east Guangdong and south Zhejiang provinces.

The distribution on Map 5.5 is very different from that on Map 5.3, as sites in Yemen and the northern Red Sea (especially Sharmah and Fustat) produced the largest numbers of sherds and a higher number of local sites, although archaeological identification of the unearthed Chinese ceramic sherds from these sites remains unclear in many cases (Figure and Table 5.2). While some sites in the very south of India participated in the Chinese ceramic trade at this time, other sites, such as Sanjan (Site 34) in the centre of India near Mumbai, declined. A clear change is apparent in the Gulf, as the trade centre at Siraf moved to Kish and the Minab area (Site 52). However, it appears that the northern coastal area of the Gulf still played a rather important role in the ceramics trade in the western Indian Ocean according to the distribution of classes (in sites 55, 97 and 123). A decline also seems to have occurred in East Africa.

This pattern suggests significant changes in the pattern of trade in the western Indian Ocean in Period 2: in the late 10th century, Indian Ocean trade changed with the decline of the Abbasid Caliphate and the rise of the Fatimid Caliphate in Egypt (Chaudhuri 1985:58). However, it should be remembered that the understanding of both Chinese trade ceramics and archaeological sites in this period is still very limited so this pattern should be regarded as quite preliminary. More work is needed to focus on the lower-quality productions of Guangdong and Fujian Province and a bridge is needed between them and the Chinese ceramic findings in the western Indian Ocean.

	Sri Lanka	India	The Gulf	The Red Sea	East Africa	Total$_1$
Site No.	6	2	11	15	3	37
%	16.2%	5.4%	29.7%	40.5%	8.1%	100.0%
Sherd No.	223	6	216	1,967	75	2,487
%	9.0%	0.2%	8.7%	79.1%	3.0%	100.0%

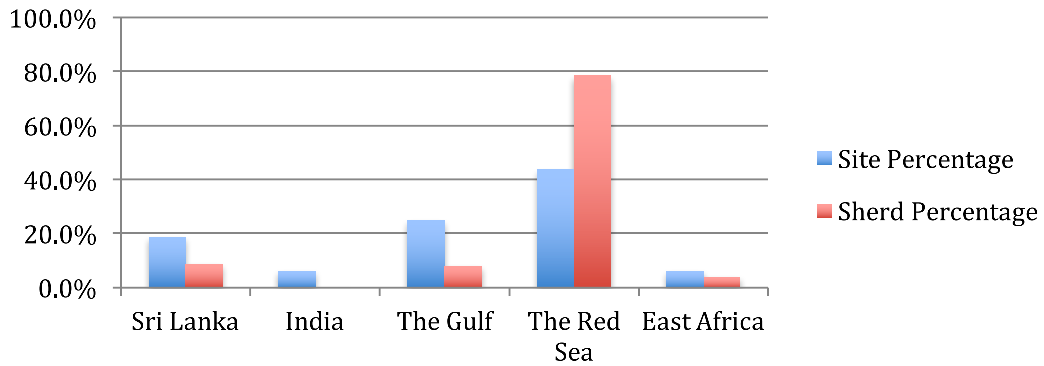


Figure 5.2: Site and sherd quantity percentage in five areas.

Total$_1$ in the table represents the total numbers of site and sherds in the western Indian Ocean (Period 2, sources based on Table 5.2)

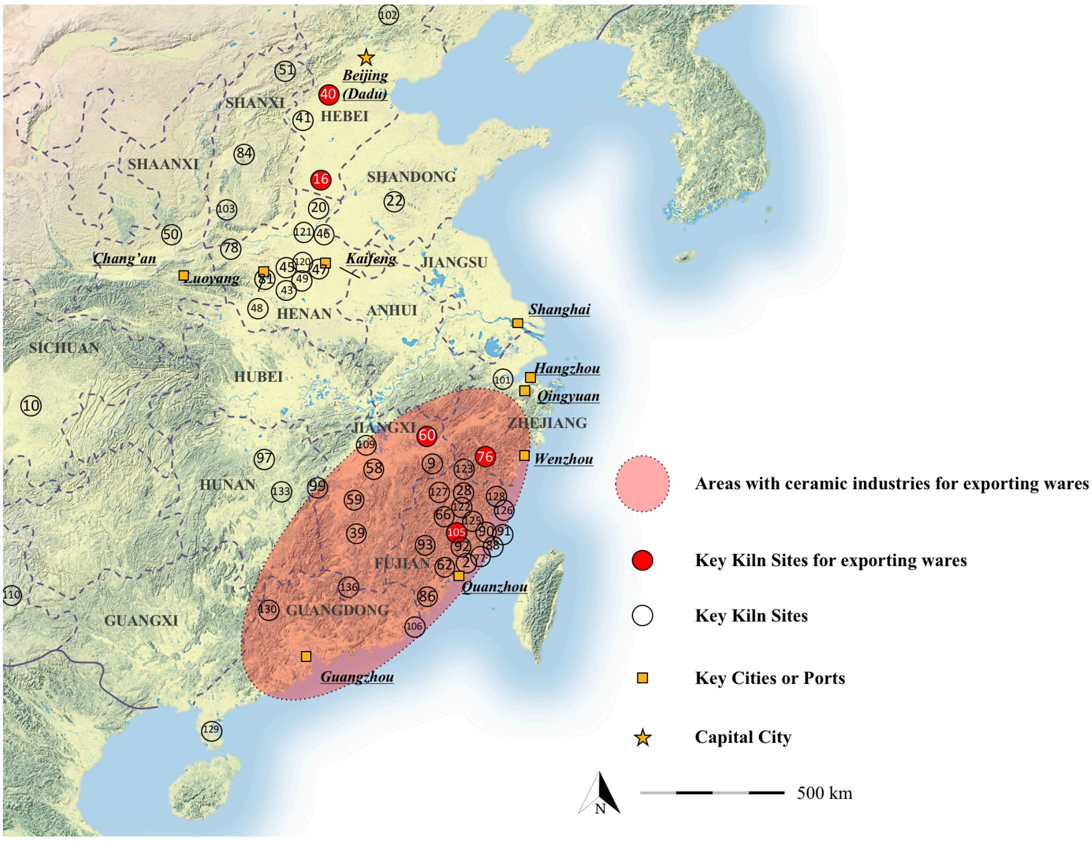
Table 5.2: This table presents the site list in the areas in western Indian Ocean that divided by trade distances of every 1,000 km from south China (Period 2).

*This table is based on Table 6.8 in Appendix 5. The site names can be found in Dataset 3 of Appendix 3 according to site numbers. There are five areas (Sri Lanka & East India, West India, The Gulf, Yemen and the Red Sea, and East Africa). In each area, the site with Chinese ceramic findings and their sherd quantities have been listed below. 'SN' means 'Site Number', which can be found in Appendix 3, 'SQ' means 'sherd quantity' and '✓' represents 'unknown sherd number'. At the bottom, the '**Total Quantity**' shows the total numbers of site and sherd quantity in each area.*

Area	**Sri Lanka & East India**		**West India**		**The Gulf**		**Yemen and the Red Sea**		**East Africa**	
	SN	SQ	SN	SQ	SN	SQ	SN	SQ	SN	SQ
Site List	Site 7	✓	Site 34	6	Site 52	111	Site 82	✓	Site 108	1
	Site 8	✓	Site 51	✓	Site 54	1	Site 83	✓	Site 110	59
	Site 40	21			Site 55	21	Site 84	✓	Site 112	15
	Site 43	200			Site 65	18	Site 85	✓		
	Site 44	1			Site 70	1	site 87	✓		
	Site 45	1			Site 79	✓	Site 88	✓		
					Site 97	12	Site 89	✓		
					Site 123	40	Site 90	✓		
					Site 126	5	Site 94	**990**		
					Site 128	1	Site 95	3		
					Site 129	6	Site 98	✓		
							Site 99	✓		
							Site 101	**972**		
							Site 102	2		
							Site 127	✓		
Total Qnt.	6	223	2	6	11	216	15	1,967	3	75

5.2.3 Period 3: Chinese Ceramic Trades in the Longquan celadon era (c. 1250-1400 AD)

The second half of the 13th century witnessed the dramatic expansion of the Mongol Empire, and this period has attracted much attention from historians and archaeologists. Abu-Lughod (1989) believes that this was an early stage in the globalisation process prior to that created and recorded by European merchants. Under the rule of the Mongol Empire, the Golden Horde, Chagatai, Ögedei, Ilkhanate and Yuan China occupied most of the Islamic-Asia continent and through their conquests and re-connections, trade by land or sea-based routes began to re-emerge in the 13th to 14th centuries (Lin 2006, Liu 2010:109, Lin 2011).



Map 5.6: Distribution maps of Chinese ceramic kilns for export wares (Period 3).
(Based on Table 6.9 in Appendix 5 and drawing by Ran Zhang)

According to the Chinese trade ceramic classes dated from 1271 to 1368 AD shown in Table 4.2-1 of Chapter IV (see classes 9, 12, 16, 17, 19, 27, 28, 38 and 40), these ceramic producers have been highlighted on Map 5.6. It shows that, as the Mongol Yuan Chinese had reunified China in the late 13th century, it can be seen that the north Chinese ceramic wares returned to the list of trade ceramics found in the western Indian Ocean (according to columns White and KN 16 of polychrome in Table 6.9 in Appendix 6). However, only Cizhou wares and possibly Ding wares from Hebei province in north China have been confirmed and it looks as if north Chinese ceramics were not involved in large scale trade.

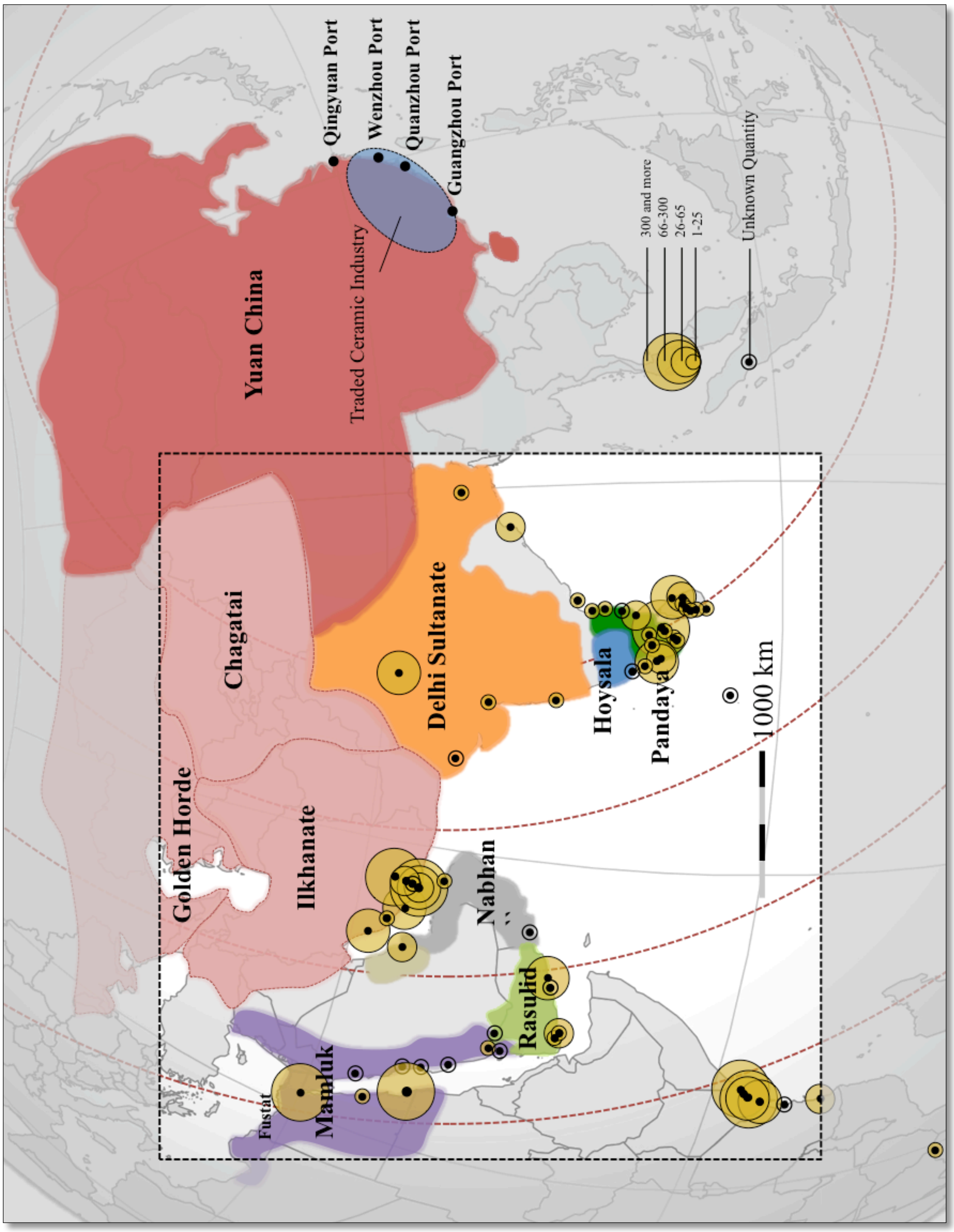
In this period South China had a totally different pattern in comparison with the north. The sudden rise of the Longquan celadon kilns and the newly invented blue and white porcelains in the Jingdezhen kilns had become the main trade ceramic manufacturing centres. Guangdong and Fujian local industries had been involved as well, but their ceramic production's quality was much lower.

This large expansion of southern Chinese trade ceramics might have benefited the new established port cities in the Chinese littoral from Shanghai to Guangzhou through the encouragement of the Yuan court of maritime trade. It has been historically recorded that "…There are seven Offices of the Superintendent of Merchant Shipping that have been established in Hangzhou, Shanghai, Ganpu (near Jiaxing in Zhejiang), Wenzhou, Qingyuan (present-day Ningbo), Guangzhou and Quanzhou ports…" (杭州、上海、澉浦、温州、庆元、广州、泉州置市舶司凡七所) (Song 1984:Volume of Shizu Benji). Although these offices were retained from the Song court's administration, their duties had changed in the Yuan dynasty: it has been suggested that Song merchant shipping offices were dealing with the regulation of maritime trade but Yuan's offices were actually conducting maritime trade by organising and dispatching maritime trading activities (Heng 2005:199).

With this enlarged traded ceramic industry in south China and the positive attitude of the Yuan court towards sea trade, it is interesting to see that there was tremendous prosperity of the Chinese ceramic trade to the western Indian Ocean on Map 5.7.

In comparison with Table 5.2, the figures in Table 5.3 show increased site numbers in all five areas in the western Indian Ocean. The entrance to the Gulf and southern India experienced a sharp increase in trade in both terms of site and sherd numbers.

Sites such as Julfar (Site 69) in north UAE, Minab (Site 52) in south Iran and Kish Island (Site 97) in the deeper area of the Gulf yielded large quantities of Chinese ceramics with a richness of Chinese ceramic classes (Table 6.9 in Appendix 5).



Map 5.7: Distribution of sites with Chinese ceramic sherd quantities (shown by yellow circles) in the western Indian Ocean (Period 3).

(This map is based on Table 5.3 and see the site locations on Map 1.2 in Chapter I, drawing by Ran Zhang)

Table 5.3: This table presents the site list in the areas in western Indian Ocean that divided by trade distances of every 1,000 km from south China (Period 3).

*This table is based on Table 6.9 in Appendix 5. The site names can be found in Dataset 3 of Appendix 3 according to site numbers. There are five areas (Sri Lanka & East India, West India, The Gulf, Yemen and the Red Sea, and East Africa) in this table. In each area, the site with Chinese ceramic findings and their sherd quantities have been listed below. 'SN' means 'Site Number', which can be found in Appendix 3, 'SQ' means 'sherd quantity' and '✓' represents 'unknown sherd number'. At the bottom, the '**Total Quantity**' shows the total numbers of site and sherd quantity in each area.*

Area	**Sri Lanka & East India**		**West India**		**The Gulf**		**Yemen and the Red Sea**		**East Africa**	
	SN	SQ	SN	SQ	SN	SQ	SN	SQ	SN	SQ
	Site 1	9	Site 5	10	Site 52	785	Site 73	✓	Site 107	✓
	Site 2	72	Site 9	1	Site 53	25	Site 83	3	Site 108	51
	Site 3	✓	Site 16	2	Site 54	15	Site 84	✓	Site 109	151
	Site 4	1,425	Site 17	✓	Site 55	51	Site 85	✓	Site 110	152
	Site 6	0	Site 18	85	Site 57	60	Site 86	✓	Site 111	497
	Site 22	15	Site 19	25	Site 65	32	Site 87	✓	Site 112	216
	Site 23	8	Site 27	2	Site 68	66	Site 88	✓	Site 114	✓
	Site 24	2	Site 28	15	Site 69	1,008	Site 89	✓	Site 115	✓
site list	Site 38	27	Site 34	3	Site 70	29	Site 91	✓	Site 116	✓
	Site 29	26	Site 35	1	Site 71	✓	Site 93	✓	Site 117	✓
	Site 40	40	Site 37	12	Site 72	1	Site 94	300	Site 118	✓
	Site 41	10	Site 50	2	Site 97	201	Site 96	✓	Site 119	✓
	Site 42	2	Site 51	✓	Site 123	36	Site 98	✓	Site 120	✓
	Site 45	7			Site 75	1	Site 99	2	Site 121	✓
	Site 46	100			Site 77	✓	Site 101	**2,692**	Site 122	4
	Site 47	2			Site 79	20	Site 102	13		
	Site 49	1			Site 126	113	Site 127	**999**		
					Site 128	42				
					Site 129	38				
Total Quantity	17	1,746	13	158	19	2,523	17	4,009	15	1,067

	Sri Lanka	India	The Gulf	The Red Sea	East Africa	Total[1]
Site No.	17	13	19	17	15	81
%	21.0%	16.0%	23.5%	21.0%	18.5%	100.0%
Sherd No.	1,746	158	2,523	4,009	1,067	9552
%	18.3%	1.7%	26.4%	42.0%	11.2%	100.0%

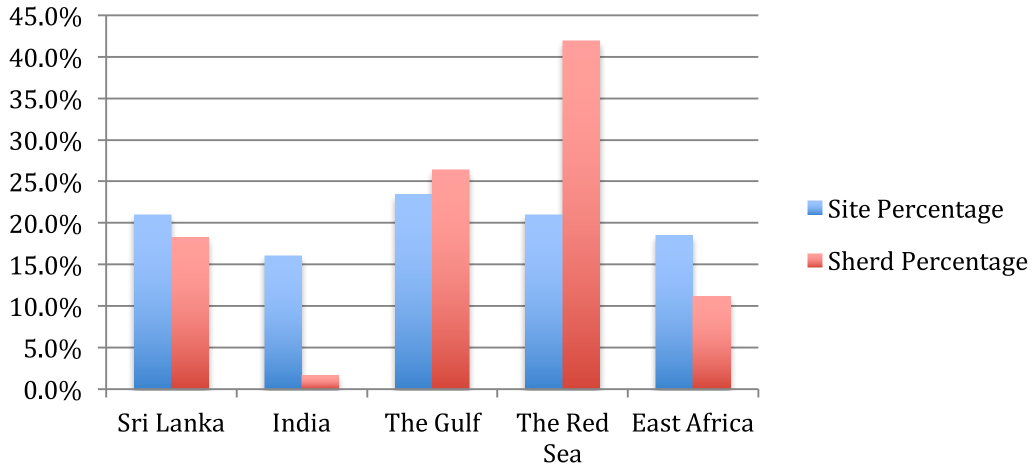


Figure 5.3: Site and sherd quantity percentage in five areas.

Total[1] in the table represents the total numbers of site and sherds in the western Indian Ocean (Period 3, sources based on Table 5.3)

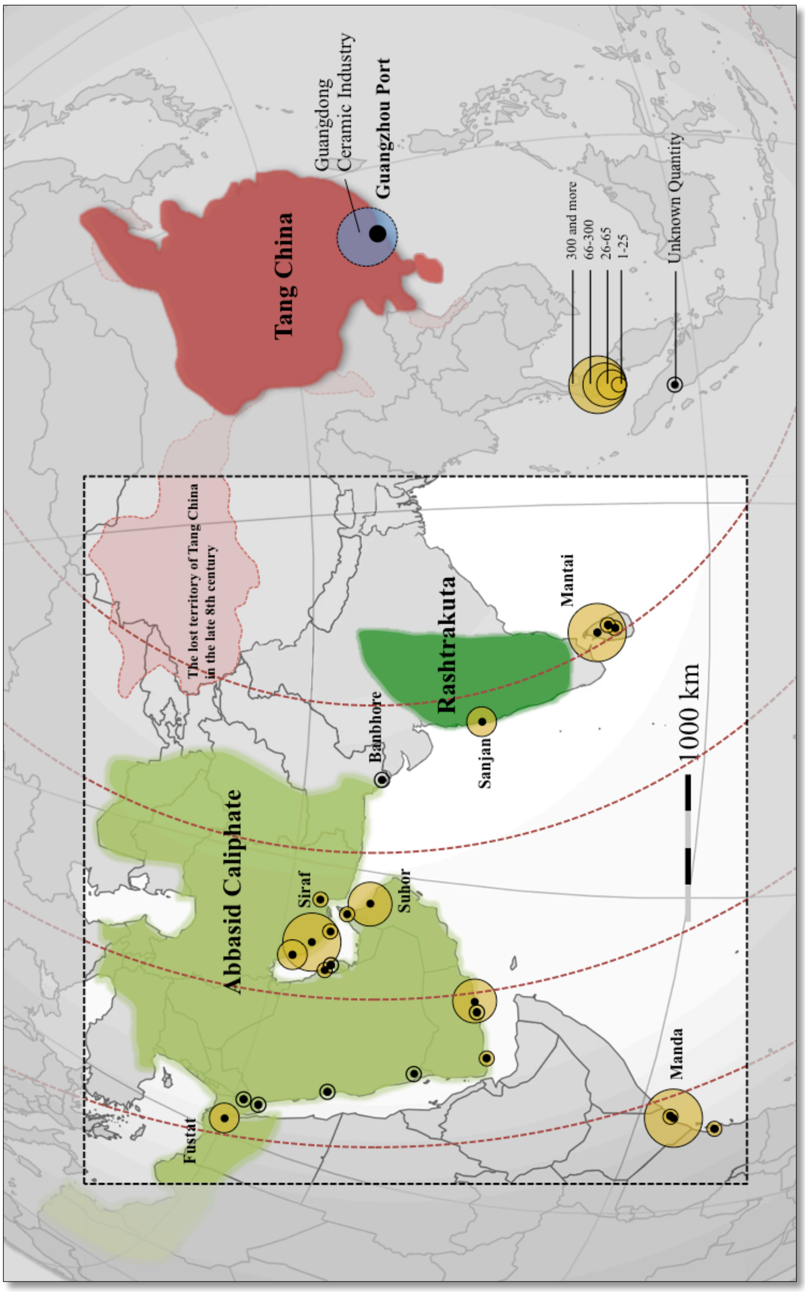
Likewise, East Africa had become a very important area in this trade via Aden in Yemen. Although the Sharmah port (Site 94) declined during this period, it still played an important role with large findings of Longquan celadon wares. Sites including Abyan, al-Qaraw, Habil and Kawd am-Saila (Sites 91, 96, 98 and 99) have yielded many classes of Chinese ceramic imports consisting of blue and white porcelains, celadon, Shufu porcelain, Martabani type wares and Dehua Qingbai stoneware. In particular, the blue and white porcelain, celadon and Shufu porcelain wares can be considered as high quality Chinese ceramics. In comparison with the number of unearthed Chinese ceramic classes, the Aden area was higher than the areas of the Red Sea but it also can be seen that the reported Chinese ceramic sherd numbers are as small as the Red Sea and south Yemen. As the entrance of the Red Sea, the Aden area has not much detail of the Chinese ceramic sherd assemblages that has been recorded and they have been described as 'scarce' or 'small' and only two assemblages of Martabani wares and Longquan celadon wares have been reported as 'many' in the site at Kawd am-Saila. However, on the contrary, at the middle and end of the Red Sea, the sites of Fustat (Site 101) and Aydhab (Site 127) produced huge numbers of Chinese ceramic imports. Over 90% (3691/4009 sherds, also see the highlighted numbers in Table 5.3) of Chinese ceramic imports in the Yemen and Red Sea area come from these two sites. This could indicate that the trade of the Red Sea entrance may no longer have been as busy as its previously level in the 11th to the middle 13th centuries, and this was probably due to the trade powers having been taken back to the Gulf by Iran due the rule of the Mongol Empire. Meanwhile, it is also highly likely that sea trade in the Red Sea maintained its prosperity and Aydhab was acting as the trade centre, as Ibn Jubayr wrote: 'This town (Aydhab) is one of the busiest port of the world with many ships from India and Yemen' (Yajima 1980, Mikami 1988:13-15).

Otherwise, it can be seen that a sharp increase also occurred in south Indian including Sri Lanka. In particular the site of Periyapattinam (Site 4) in southern India yielded a huge number of Chinese ceramics, which can be divided into five classes (Dataset 3: Site 4 in Appendix 3). With rich distributed local sites in south India and Sri Lanka, this area was closely involved in the trade of Chinese ceramics.

5.2.4 Period 4: Chinese Ceramic Trades before the Ming China maritime 'withdrawal' (c. 1400-1433 AD)

Since the late 14th century, the fragmentation of the Mongol Empire left a complicated patchwork of many relict states in Eurasia. The Ming armies defeated Mongolian Yuan China in 1368 AD which led to the establishment of the Ming Dynasty. Mongol rulers fled to their homeland, Mongolia. Chagatai and the Golden Horde lost the connections with Mongolia and China and were invaded by Timur. At the same time, the Delhi Sultanate also lost most of its land in modern middle and southern India, while south India was under the rule of Vijayanagar.

Clear changes occurred not only in political patterns, but also in economic production and consumption patterns. In northern China the ceramic industry sharply declined, while south Chinese establishments of Imperial Ceramic kilns settled in Jingdezhen and Longquan, and two of them were in the leading position among ceramic industries in this period. These two ceramic kilns had monopolies in Chinese ceramic manufacturing and may have been strongly linked to the export of Chinese ceramics in this period.



Map 5.8: Distribution of sites with Chinese ceramic sherd quantities (shown by yellow circles) in the western Indian Ocean (Period 4).

(This map is based on Table 6.10 in Appendix 5 and see the site locations on Map 1.2 in Chapter I, drawing by Ran Zhang)

Map 5.6 shows that there was poor distribution of archaeological sites with Chinese ceramic finds. As shown in Table 3.5 (see Chapter 3) and Table 6.10 (see Appendix 5), a big gap in Chinese ceramics imports to the western Indian Ocean occurred in the 15^{th} century (including the very late 14^{th} century). It is interesting to see that, although the quantity of Chinese ceramic sherds declined sharply, the imperial type of blue and white porcelain manufactured in the Jingdezhen kilns and celadon wares made in the Longquan kilns were found. This was the first time that these high-quality ceramic wares with Ming Chinese Imperial attributions had been traded to foreign markets. These finds can perhaps be linked to the Official Voyages, sent by the Ming Emperor Zhu Di and led by admiral Zheng He (Lin and Zhang 2015). This supports the notion that trade between Ming China and the western Indian Ocean was highly likely to have been monopolised by Ming official trade and expeditions.

However, it should be noted that there are sites without Chinese ceramic imports in the western Indian Ocean. In this period, the pattern shown by Chinese ceramic imports might be biased, and it was perhaps due to other merchants, such as South-eastern Asian merchants, participating much more in this trade, rather than Chinese merchants (cf. Brown 2009) because private merchants were not allowed to trade outside China due to the 'Sea Ban' in the early Ming period. It has been suggested that a rise in Southeast Asian ceramics occurred as a replacement for Chinese ceramics (Brown 2009). Combined with the suggestion of the Ming Gap (Harrisson 1958) and investigations of shipwrecks in the east Indian Ocean (Brown 2009), there is clearly a shortage of Chinese ceramic finds dating from the 15^{th} century and to the early and middle of 16th century (according to Table 6.11 in Appendix 5, there was a sharp growth of Chinese ceramic imports again in the western Indian Ocean).

Attempts have been made by some Chinese scholars to argue that the Ming Gap theory is not conclusive, based a large number of Longquan finds from the Gedi site (Site 111) (Liu et al. 2012:59, Qin and Liu 2012:19-20). However, according to the intensive trade pattern for the Indian Ocean shown in Table 6.10 and Map 5.8 and in comparison with the trade pattern in the 14^{th} century, there was a clear decline in the

Chinese ceramic trades in the western Indian Ocean and the evidence is not sufficiently reliable to support this challenge.

It has been suggested that Zheng He's voyages did not meet the great expectations to monopolise maritime trade profits, and China's economy collapsed with Ming Chinese withdrawal from the maritime trade in the middle of 15th century (Lo 1958, Abu-Lughod 1989:340-341, 347). The archaeological evidence supports the 'Ming Gap' in Chinese ceramic trade.

5.3 Conclusion of chapter 5

The end of the 15th century marks a new age for the Indian Ocean, as European merchants began to trade and expand their powers in this area. The East India Company ended the caravan trade and linked China and Europe (Steensgaard 1974). This is reminiscent of the 8th century, as it marks a new age for the Indian Ocean, which is the main focus of this chapter, and was an age characterised by the entrance of Arab merchants who connected China to the Islamic world with large scale trading.

This chapter has reviewed and tentatively explored some of the key trends in Chinese ceramic trade patterns in the western Indian Ocean from the 8th to 15th centuries that have begun to emerge from the data collected for this thesis. It is important to try to understand pre-European trade history through Chinese ceramic trade due to a lack of historical sources. Although much more information could be extracted from further analysis of the data sets collected for this study, there is a limit to what is possible within the space of a PhD thesis. It is hoped that the case has been that there is some value in taking a general, long-term and comprehensive approach to trade ceramics rather than focussing on specific periods, wares, regions or sites. The data collection from over 120 archaeological sites presented and discussed here, even though they lack detail and accuracy in some cases, has allowed the discussion of a broader framework of the development of trade that would otherwise be difficult to discern.

The present limitations of archaeological data mean that it remains difficult to outline the full trade networks of the western Indian Ocean during the medieval period. Without archaeological missions in areas such as Iraq, Iran and the Red Sea, it will be difficult to understanding fully history of this trade. Chinese ceramics have natural advantages when reviewing these trade patterns due to the precision of their dating and provenance but it is important to remember that Chinese ceramics were not the only commodities in this trade (Rougeulle 1996:175).

The Gulf area played a significant role in maritime trade from China to the West, and even during the 11th to the 13th centuries powers from the Red Sea and India separately participated in this trade. The well-founded wealth of Basra and the key geographical position of the Hormuz provided key advantages for the Gulf to establish itself as a trading centre for intercontinental trade. The biggest disadvantage was that there was no long lived, peaceful and stable dynasty after the 11th century in the Gulf, in comparison with the Red Sea and southern India. Conflicts between different states under the Abbasid Caliphate and the invasion of the Mongols must have had a strong negative influence on the trading power of the Gulf. This may be the reason for the movement of the trading centres from the middle (Siraf) to the entrance (Hormuz) of the Gulf (Lin 2012).

Indian and East African interest in Chinese ceramics occurred later than in the Gulf and Red Sea. The evidence demonstrates that the growth in Chinese ceramic imports in southern India and East Africa occurred in the 14th century. Northern India participated less in this trade, although evidence of its interest in Chinese ceramics can be found throughout the 8th to 15th centuries, reaching a peak in the 14th century.

CHAPTER 6: CONCLUSION

This thesis has presented a new, standardised classification of Chinese trade ceramics from the 8th to the 15th centuries and has used it to re-examine and re-assess the distribution of trade ceramics around the western Indian Ocean. Three principal conclusions have emerged, which will be summarised briefly here.

6.1 Trade ceramic industries in China from the 8th to the 15th centuries

As has been addressed in Chapter 2, Chinese ceramic history has been very well studied by both Chinese archaeologists and Western scholars for many decades. However, many if not most of these studies are based on complete and high-quality ceramic objects. From the perspective of a long-term historical perspective, lower-quality ceramics and small-scale productions have often been ignored, as has the need for a classification that is more easily applicable to the highly fragmentary assemblages of small sherds that are typical of excavation material, where complete shapes and decorative schema are not always clear enough to use for classification. These coarser productions, which are by far the most significant proportion of trade ceramics, and their producers, have, for the most part, been examined only in individual academic studies. For this thesis, data on both high- and low-quality ceramic producers has been collected from 200 kiln sites across China, some with many kilns, and then grouped into 40 types of production wares that were made for export during the 8th to 15th centuries. With the dating evidence available for each kiln site, the patterns of Chinese ceramic industries have been outlined for the first time.

Combining the general and extensive background of Chinese ceramic industries (Chapter 2) and the trade ceramic identifications in the classification (Chapter 4), the locations and changes of Chinese trade ceramic industries, in terms of archaeological evidence, have been separately presented (Chapter 5). This is the first such study with a focus upon Chinese trade ceramic industrial production.

As the study has shown, in the 8th to 9th centuries, with the beginning of the large-scale and long-distance trade of Chinese ceramics from China to the northern Indian Ocean rim, and in particular to the Gulf, China developed three industries for supporting these trades. As indicated in Map 5.2 (Chapter 5), they were located in Zhejiang/Fujian provinces, Guangdong province and Henan province. Large quantities of ceramic wares manufactured in these industries were involved in the early ceramic trades in the western Indian Ocean. Moreover, it is interesting to see that the Changsha kilns in Hunan province and the Gongxian kilns in Henan province, workshops that were located far inland, were producing polychrome wares to satisfy foreign (mainly Near Eastern) tastes (CSYKTZ 1996:227-228, Li 2011a:264-266), and some of these productions might actually have been designed for the export markets. However, these kilns suddenly declined in the 10th century and ceramic wares designed for foreign tastes were not seen again until the 14th century, for both domestic and foreign trade.

Furthermore, the northern Chinese trade ceramic industry completely declined in the following centuries (see Maps 2.1 to 2.6 in Chapter 2 and sections 5.4, 5.6 in Chapter 5). Although some northern Chinese ceramic productions were traded, they were only a very small percentage. For instance, Yaozhou celadon (produced in Shaanxi province) and Ding white wares (produced in Hebei province) separately accounted for 1.1% and 0.4% of all Chinese trade ceramics in the period from the 11th to the 13th centuries (see Table 6.8 in Appendix 5), and only four out of 80 sites in the western Indian Ocean reported the occurrence of Cizhou polychrome wares in the 14th century (produced in Hebei province, see 6.9 in Appendix 5).

In southern China, in the period from the 10th to the 15th centuries, the trade ceramic industries were mainly located in the southern Zhejiang, Fujian and Guangdong provinces, as well as in Jiangxi province centred on the Jingdezhen kilns. These areas were the key and stable producers of trade ceramic commodities.

The above-mentioned points could indicate that, with the geographical advantage that sites had for maritime trade in the southeast littoral area of China, this was the location of the large, stable and long-term industries of trade ceramics from the 8th to the 15th centuries, although many local kilns, such as those of Fujian and Guangdong, were producing rough, low-quality ceramics. Conversely, the inland and northern Chinese ceramic kilns seemed to be involved only with difficulty and sporadically in the maritime trade, probably due to their geographical situation far from the port cities, although their productions were of good quality (such as the Yaozhou and Ding kilns), and of suitable designs for foreign markets.

6.2 Trade of Chinese ceramics in the western Indian Ocean

In previous studies (see section 3.1 to 3.3 in Chapter 3) a fuller understanding of Chinese ceramics imported to the western Indian Ocean is similarly hampered by limited geographical knowledge. A good example is the work by Axelle Rougeulle (1996), which focuses on the Near East (the Gulf, the Red Sea and East Africa) rather than the whole of the western Indian Ocean. Lacking materials and collections from India and Sri Lanka, Rougeulle could provide only a limited analysis of the western Indian Ocean as a whole. To address this, in Chapter 3 of this thesis data from over 120 sites was collected and over 500 groups of Chinese ceramic assemblages made up of over 25, 000 sherds separately dated from the 8th to the 20th centuries.

The datasets collected in this thesis provide a chance to observe the Chinese ceramic trade from the Far East to the Near East in a quantitative way, which might initially indicate changes in the maritime economy in the long term and over a wide geographical area. It aims to explore this uncharted area as a page in the history of developing globalised international trading system in the 'pre-European period' before the 16th century. Past historical and archaeological observations (mentioned in section 3.2 in Chapter 3) have been echoed in this exploration.

6.2.1 A sudden rise of Chinese ceramic trade

Large quantities of Chinese ceramic finds and frequent occurrences in many sites around the western Indian Ocean are evidence that a sudden rise in Chinese ceramic trade occurred by the middle of the 8th century. Such evidence has not been found for previous centuries, although small volumes of Chinese ceramics are known to have been traded to Southeast Asia in the pre-7th century period (Guy 1986:1-2). This sudden rise was probably due to several reasons: (1) the decline of the land-based Silk Road in the 8th century offered Tang China an incentive to develop maritime trade; this decline was caused mainly by instability and conflicts in central Asia and economic collapse and political chaos in northern China (Wei 1999:53, Franke and Twitchett 1994:5-6, DeBlasi 2001:7, Lewis 2009:42-44, 157-158); (2) the gradual improvement in Chinese ceramic manufacturing techniques in the 8th century meant that Chinese ceramics were more in demand from foreign markets and became one of the common/luxury commodities in long-distance trade (Chaudhuri 1985:39; also see section 2.2.2 in Chapter 2); (3) the expansion of seafaring by the Sasanians was unprecedented in Arab maritime travel; they reached South Asia and China by the pre-Islamic period (Whitehouse and Williamson 1973, Chaudhuri 1985:37, Piacentini 1992:124-125, Hourani 1995:38), and after that small quantities of exotic imports first appeared in the Gulf (Priestman 2013:404-406).

6.2.2 Peak and troughs of the Chinese ceramic trade

As discussed in the preliminary analysis in Chapter 3 (see Figure 3.7-1, 2), the state of Chinese ceramic trade in the western Indian Ocean during the 11th to 13th centuries is not clear. A reduced number of sherds have been found (from 3,479 in the 8th to 10th century to 2,487), but at an increased number of sites (from 26 to 37). This situation might be linked with the unstable political and economic environments in the Gulf: with the gradual and general decline of Siraf and the status of the medieval port cities in the Gulf after the late 10th century (Whitehouse 1975), the trade centres started to shift from the Gulf to the Red Sea (Rougeulle 1996). Overall, there is a relatively unclear picture of the presence of the Chinese ceramic trade, in comparison with the evident sudden rise in the trade in the earlier period.

In contrast, it is very clear that the Chinese ceramic trade reached its peak during the 14^{th} century (9,552 sherds from 81 western Indian Ocean littoral sites, see Table 3.5 in Chpater 3), with Longquan celadon playing an important role among all traded Chinese ceramics (see Table 6.9 in Appendix 5). This development at that time seems to be an echo of the so-called 'mid-13^{th} to mid-14^{th} century world-system' suggested by Abu-Lughod (1989) – which was really a globalising maritime trade network. The archaeological evidence of this Chinese ceramic trade peak in the 14^{th} century could suggest that there was an economic boom in long-distance trade from the Far East to the Near East. Subsequently, big troughs in both sherd and site numbers occur for the 15^{th} century (see Figure 3.7-1, 2); this was perhaps due to the Ming Chinese maritime trade and economic decline at that time (Lo 1958:340-341, Abu-Lughod 1989).

6.2.3 'Celadon Age' and 'Blue and White Porcelain Age'

According to Dataset 3 (in Appendix 3) both Chinese celadon and blue and white porcelain wares have been widely uncovered in the western Indian Ocean (as shown in Figure 6.1). It seems that they were traded in large quantities from the 8^{th} to the 17^{th} centuries as part of the long-distance trade from China to the western Indian Ocean.

The figure shows that there were probably two ages of Chinese ceramic trade within the long period from the 8^{th} to the 17^{th} centuries: the earlier one could be called the 'Celadon Age', ranging from the 8^{th} to the 15^{th} centuries, and the later one the 'Blue and White Porcelain Age', dating from the 16^{th} century onwards. The 'Celadon Age' can be seen clearly. With the much higher proportions of celadon wares among all Chinese trade ceramics, it grew steadily from the 8^{th} to the 15^{th} centuries (from 18.7% in the 8^{th} century to 85.7%) with a sharp increase in sherd numbers for the 14^{th} century (from 1,178 in the 11^{th} to the 13^{th} centuries to 7,140 sherds), although there was a numerical trough in the sherd numbers for the 15^{th} century.

Conversely, large quantities of traded blue and white porcelain were not seen before the 16^{th} century. It has been argued that the period of successful manufacturing of blue and white porcelain in China was in the middle of the 14^{th} century (Li 1998:370-371, cf. Kerr and Wood 2004:219, Feng 2009:452-456); however, during the period from the middle14th to the 15th centuries, celadon wares were still the major part of the Chinese ceramics traded to the western Indian Ocean, and blue and white porcelain wares accounted for no more than 13% (Figure 6.1).

Class	Value	8th to 10th cent.	11th to 13th cent.	14th cent.	15th cent.	16th to 17th cent.
Celadon	No. (Total No.)	650 (3,479)	1,178 (2,487)	7,140 (9,552)	933 (1,087)	6 (4,782)
	%	18.7	47.4	74.7	85.7	0.1
CBW	No. (Total No.)	1 (3,479)	0 (2,487)	645 (9,552)	150 (1,089)	4,565 (4,782)
	%	0	0	6.8	13.8	95.4

Table A

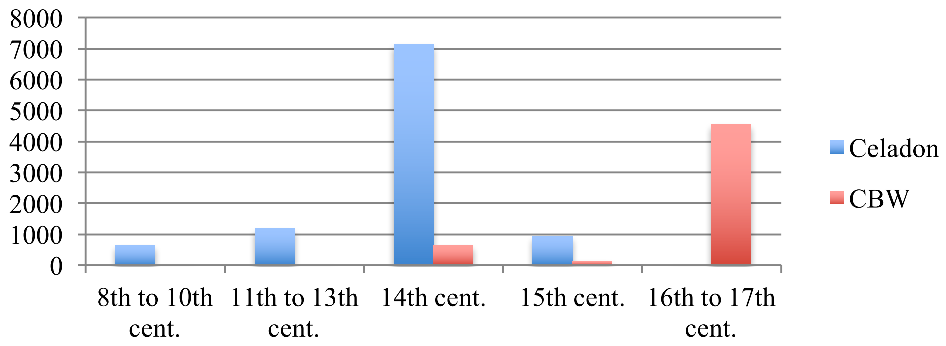


Figure B

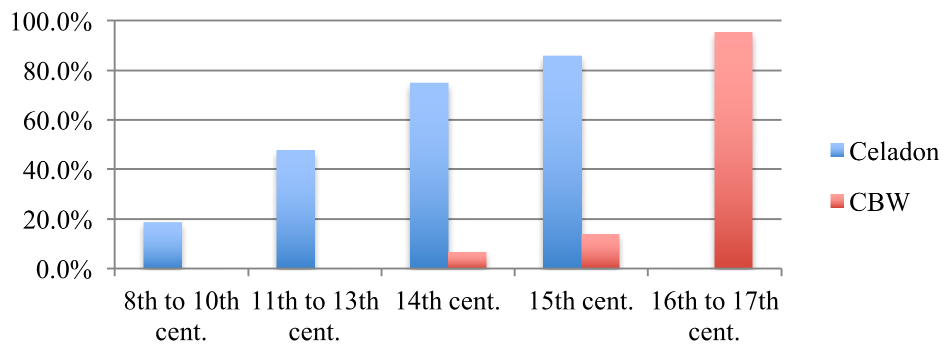


Figure C

Figure 6.1: Number and percentages of celadon and CBW wares imported to the western Indian Ocean, from the 8th to 17th centuries.

Table-A presents the number and percentages of celadon and CBW (Chinese blue and white porcelain) wares that have been discovered from western Indian Ocean sites, based on the data from Tables 6.7 to 6.11 in Appendix 5. Figures B and C are based on Table A, and show the changing trends of celadon and CBW wares according to the sherd numbers and their percentages

This situation changed sharply after the 16th century: with the vast expansion of manufacturing techniques of blue and white porcelain in China, after this time traded CBW wares made up over 95% of all Chinese trade ceramics, while the celadon industry in China and its trade declined markedly (see section 2.5.1-5 in Chapter 2 and Figure 6.1: Table-A).

Celadon wares had their advantages for trade: (1) they could be more easily manufactured than other monochrome wares, such as pure white stoneware (which needed better and whiter clays), or polychrome wares, such as Changsha ware (which required colour agencies, better firing conditions and skilled painters); hence the wide distribution of the celadon industry in China, particularly in Zhejiang, in the period before the 15th century (see section 2.5.2 in Chapter 2); (2) there was a high demand for celadon wares in western Asia, where the fine glazes and colours of these ceramics were much appreciated. There was even a widespread belief that Chinese celadon could test the presence of poison in food (Chaudhuri 1985:39). These two reasons could explain the frequent occurrences of celadon wares in the period before the 16th century.

6.3 The classification system of Chinese trade ceramics: wider implication

The core part of this thesis is an attempt to create a revised classification system for Chinese trade ceramics during the period from the 8th to the 15th centuries. Though still imperfect, this system, as it has been initially applied in this thesis for the purpose of analysis, provides a chance to examine the economic development of trade within the western Indian Ocean in more detail than has been possible before using an exploratory quantitative method.

This classification system has been evolved from the large datasets of over 400 archaeological sites, kiln sites, surface surveys and tomb excavations in both China and the littoral areas of the western Indian Ocean. With these datasets, over 40 classes of Chinese trade ceramics have been individually classified, dated and identified.

It is hoped that this classification can be further applied, as a standardised system, by future archaeologists and scholars for archaeological and historical studies, and also can be combined with other pottery classification systems, such as the general and integrated ceramic classifications developed by Kennet (2004) and Priestman (2013).

Together with an application of this system, these standardised classes of Chinese ceramics can be used as quantitative indicators for the study of economic history in the field of medieval archaeology. Individually, these ceramic classes can be used for dating evidence in archaeological excavation and missions. In the larger picture, the *longue durée* history of trade from China and the western Indian Ocean can be observed with more accumulated datasets of Chinese ceramic finds by using this classification system.

6.4 Further possibilities

As mentioned in previous chapters, Chinese ceramics have natural advantages in archaeological studies and are very attractive for archaeologists to recreate the history of economic changes in the western Indian Ocean, due to their distinctive appearance and well-dated chronologies. It is therefore worth exploring further quantitative studies of Chinese trade ceramics, in particular for those archaeological sites with higher quantities.

For the future, there are unpublished and excluded materials, studies and documents which could be considered. Detailed studies of each class in this classification and the historical periods are worthy of further development. In particular, more detailed recording is required of pottery from archaeological sites in the region, going beyond simple sherd counts and classification to include information about trends in trade, using a standardised system of description. For example, the most problematic classes are the white and Qingbai stoneware produced in Guangdong and Fujian provinces in the 11th to 13th centuries. Each province of Guangdong and Fujian had a huge-scale ceramic industry, but their archaeological development and history that links to western Indian Ocean archaeology is rather weak. The same situation also occurs for Longquan ceramics and kilns, although they have been relatively well described and introduced in this classification. The huge ceramic industry of the Longquan kilns in the 14th century is worth detailed investigation, due to the large quantities of ceramic productions that were imported to the western Indian Ocean at that time.

With further information of the abundance of Chinese ceramics in many sites in the western Indian Ocean, future studies on testing a methodological approach based on quantitative interpretations will be an essential direction.

Appendix 1:

Dataset 1: Important ceramic kiln sites and their dating.

*This dataset presents an extensive collected data of the important and key Chinese archaeological sites of ceramic kilns in China, which are dated to the 6th to 16th centuries. For each collected kiln site, this dataset provides their information that consists of '**KN'** (kiln-site numbers), '**Location'** (the provincial locations of these kiln sites), '**Kiln Names'** (both in English and Chinese), '**Dating'** (the dating periods of these kiln sites), '**Dating Evidence'** (the key archaeological dated evidence from this kiln site) and **References**. Among these information, the kiln-site number of each kiln is unique and they have been applied in this thesis by using the form of 'KN + number' (e.g. the Shouzhou kilns are in the form of KN1). All collected kiln sites are numbered by following this form from KN1 to KN140. This means that, in this dataset, there are 140 kiln sites. For '**Location'**, the Chinese provinces will be wrote in short form with their capital letter of these provinces. These short form and provinces are: **AH=Anhui, CQ=Chongqing, FJ=Fujian, GD=Guangdong, GX=Guangxi, HB=Hebei, HN=Henan, HUB=Hubei, HUN=Hunan, JS=Jiangsu, JX=Jiangxi, SC=Sichuan, SD=Shandong, SHX=Shaanxi, SX=Shanxi, YN=Yunan and ZJ=Zhejiang**. For '**Dating'**, their dating periods are based on Chinese dynasties, and they are: **p=Pre-Tang to early Tang (6th to 7th centuries), t=Middle Tang (8th to 9th centuries), f=Five Dynasties (about 10th century), n=Northern Song (11th to 12th centuries), s=Southern Song 1127-1274 AD (~12th to 13th centuries), y=Yuan 1274-1368 AD (~14th century), m=Ming 1368-1644 AD (~15th to 16th centuries)**. In terms of '**Dating evidence**', there are about seven types of dating proofs for these kiln sites: (1) Ceramics (based ceramic chronological shapes), (2) coins (unearthed datable coins from kiln sites), (3) tombs (other datable tombs with unearthed similar ceramic wares), (4) KF (Kiln furniture with datable inscriptions), (5) HR (Historical Records), (6) Datable Ceramics (Unearthed ceramic wares with datable information, such as inscriptions, moulded dating information or datable calligraphy) and (7) Datable Materials (other dating information, such as unearthed steles and kiln structures).*

KN	Location	Kiln Name	Dating							Dating Evidence	References
1	AH	Shouzhou 寿州窑	p	t						Ceramics; HR; Coins	(Hu 1988:747-748, Tao 2011)
2	FJ	Cizao 磁灶窑	p	t	f	n	s	y		Ceramics	(Chen et al. 1982:490-498, FJSBWG 2000a, AXXWHG 1977:64-65)
3	FJ	Huai'an 怀安窑	p	t						Ceramics	(FJSBWG 1996)
4	GX	Guilin 桂林窑	p	t	f	n	s			Ceramics; coin: 1071 AD	(GLBWG 1994:524-525, GXZZZZQWWGZD 1984:211-212)
5	HUN	Yueyang 岳阳窑	p	t	f	n				Tombs: 351 AD, 493 AD, 494 AD, 610 AD	(Zhou 1978:76-77, Zhou et al. 1984, Huang 1989)
6	JS	Yixing 宜兴窑	p	t						Ceramics	(NJSBWG 1984, Xiao 1982)
7	JX	Zhangshu 樟树窑	p							Ceramics	(ZSSBWG 1991)

KN	Location	Kiln Name	Dating							Dating Evidence	References
8	JX	Hongzhou 洪州窑	p	t	f					Ceramics; Datable Materials	(Cheng et al. 1984:92-93, JXSWWKGYJS 2003, JXSWWKGYJS and JXSYXBWG 2012, Chen 1963)
9	JX	Yanshan 铅山窑	p	t	f	n	s	y	m	Ceramics	(Wang 1986:1047-1048)
10	SC	Qionglai 邛崃窑		t	f	n				Ceramics	(SCSWWGLWYH 1991)
11	SC	Qingyanggong 青羊宫窑	p	t						Ceramics	(SCSWWGLWYH 1984)
12	ZJ	Deqing 德清窑	p							Ceramics; Tombs	(Zhu 1989c, 1990)
13	ZJ	Yue 越窑	p	t	f	n	s			Ceramics	(Zhu 1981, Jin 1958, Li 1973, ZJSKWWKGYJS et al. 2002, Li 2011b, Lei et al. 2014, Luo 2012)
14	ZJ	Wuzhou 婺州窑	p	t	f	n				Ceramics	(Gong 1984:27-29, 1987, JXSWWKGYJS and YSXBWG 2007)

KN	Location	Kiln Name	Dating							Dating Evidence	References
15	ZJ	Ou 瓯窑	p	t	f	n				Ceramics	(Jin 1990, ZJSBWG 2009, Jin 1965)
16	HB	Cizhou 磁州窑	p		f	n	s	y	m	Ceramics; Coins: Song; Tombs: 933 to 1352 AD	(Feng 1959, Qin and Ma 1990:19-22, Guo 2005)
17	HB	Xing 邢窑	p	t	f	n	s			Tomb; Ceramics; HR	(Shi et al. 2006, Yang and Lin 1981, Jia and Jia 1987)
18	HN	Gongyi 巩义窑	p	t						Ceramics; Datable Material; tombs: 690-700 AD, 709 AD, 842 AD	(BJYSBWG 2011:27-28, HNSWWKGYJS and ZGWHYCYJY 2011:128-129)
19	HN	Xingyang 荥阳窑	p	t						Ceramics	(Zhang 1984:21-22)
20	HN	Anyang 安阳窑	p	t		n	s	y		Tombs: Sui to Yuan ; Ceramics	(Wei 1986, HNSBWG 1977)
21	SD	Qufu 曲阜窑	p	t						Ceramics; Tombs: 784 AD	(Song and Liu 1985:39-40)
22	SD	Zhongchenhao 中陈郝窑	p	t	f	n	s	y	m	Ceramics, Tombs: 584 AD	(SDDXLSXKGZY and ZZSBWG 1989:383-384, ZZSWWGLZ 1984, Feng 1995)

KN	Location	Kiln Name	Dating							Dating Evidence	References
23	SD	Zibo 淄博窑	p	t	f	n	s			Ceramics; Coins: Tang to Song	(SDZBTCSBXZ 1978:49-50, 1984, ZBSBWG 1987)
24	AH	Yanqian 岩前窑		t						Ceramics	(Han and Feng 2012)
25	AH	Songkou 竦口窑		t	f	n	s			Ceramics	(Han and Feng 2012)
26	AH	Kongling 孔灵窑		t	f	n	s			Ceramics	(Han and Feng 2012)
27	AH	Qinxi 琴溪窑		t	f	n	s			Ceramics	(Han and Feng 2012)
28	FJ	Jianyang 建阳窑		t	f	n	s	y	m	Ceramics; KF: about 888 AD	(Fu et al. 1990:37, Li 1990, Xie 1996, FJSBWG 1990b, Zhang and Xu 1994, FJSBWG 2000c)
29	HUB	E'zhou 鄂州窑	p	t	f	n				Ceramics	(EZSBWG 1995)
30	FJ	Guangze 光泽窑		t		n	s			Ceramics	(Ye 2005c)
31	FJ	Jiangle 将乐窑		t						Ceramics	(FJSBWY 1959)
32	GD	Chaozhou 潮州窑		t		n				Coins	(GDSBWG 1981:40, Huang and Yang 1983:525, Zeng 1964a)
33	GD	Xicun 西村窑				n				Tombs; Datable Ceramics	(GZSWWGLWYH 1958:10-11, GZSWWGLWYH and AMOCUH 1987)

KN	Location	Kiln Name	Dating							Dating Evidence	References
34	GD	Gaoming 高明窑		t						Ceramics	(Yang and Cui 1993)
35	GD	Meixian 梅县窑		t			s			Ceramics	(Yang 1994)
36	GD	Foshan-Shiwan 佛山石湾窑		t		n			m	Ceramics; Datable Ceramics: Ming	(Chen 1978:199)
37	GD	Guanchong 官冲窑		t	f	n				Ceramics; Tombs-Tang	(Liu 2000:42)
38	HUN	Changsha 长沙窑		t						KF; Tombs;	(CSYKTZ 1996, Huang 2003, CSYBJWYH 2004)
39	JX	Ganzhou 赣州窑		t	f	n	s	y		Ceramics; Tombs: Tang	(JXSWWKGYJS 1990, Xue and Luo 1983, Peng 1966, Chi 1984, JXSWWKGYJS and JSLNXWGS 2013, Liu 1991, XWXWWPCD 1984, Xia 1984, Wan 1987, Chen 1990)
40	HB	Quyang/Ding 曲阳/定窑		t	f	n	s	y		Coins: Late Tang to Northern Song;	(Lin 1965:400-411)
41	HB	Jingxing 井陉窑		t	f	n	s	y		Ceramics	(Guo 2001, Liang 2005)
42	HN	Huixian 辉县窑		t						Ceramics	(Li 1965:42)

KN	Location	Kiln Name	Dating							Dating Evidence	References
43	HN	Lushan 鲁山窑		t	f	n	s	y		Ceramics; HR: 848-850 AD	(Li and Li 1980:57-59, Zhao et al. 1988:63)
44	HN	Mixian 密县窑		t	f	n				Ceramics	(Feng 1964b, Zhou et al. 1995:559-560)
45	HN	Dengfeng 登封窑		t	f	n	s	y		Ceramics	(Feng 1964b, Li and Liu 2011)
46	HN	Hebi 鹤壁集窑		t	f	n	s	y		Ceramics; coins: Song	(Zhao and Li 1964:10-11)
47	HN	Yuzhou 禹州窑		t		n	s	y		Tombs: 754 AD; 846 AD; KF: 866 AD; HR	(BJDXKGWBXY and HNSWWKGYJS 2005, HNSBWG 1975)
48	HN	Neixiang 内乡窑		t	f	n	s	y		Ceramics	(HNSWWYJS 1984a:314, 317)
49	HN	Jiaxian 郏县窑		t		n	s	y		Ceramics	(Zhao et al. 1985)
50	SHX	Yaozhou 耀州窑		t	f	n	s	y	m	Coins; Datable Ceramics: Song; HR; Tombs	(SXSKGYJS and YZYBWG 1998, SXSKGYJS 1965)
51	SX	Hunyuan 浑源窑		t	f	n	s	y		Ceramics	(Feng 1984:419)
52	SX	Pingding 平定窑		t	f	n	s			Ceramics	(ZGGSYXH 1982:Chapter 6)
53	AH	Fanchang 繁昌窑			f	n				Ceramics; Tombs, Coins	(Yang et al. 2006:47-48)

KN	Location	Kiln Name	Dating							Dating Evidence	References
54	AH	Renli 仁里窑			f	n				Ceramics	(Han and Feng 2012)
55	AH	Yaotouling 摇头岭窑			f	n				Ceramics	(Han and Feng 2012)
56	AH	Xiajian 霞间窑			f	n				Ceramics	(Han and Feng 2012)
57	HUN	Hengyang 衡阳窑		t	f	n				Ceramics	(Zhou 1984b, Liu 1984:264-265, Xiang 1996)
58	JX	Linjiang 临江窑			f	n	s	y	m	Ceramics	(Yu 1995)
59	JX	Jizhou 吉州窑		t	f	n	s	y		Tombs: Tang to Yuan	(JXSWWGZD 1984a:487-488, Zhou 1994)
60	JX	Jingdezhen 景德镇窑			f	n	s	y	m	Coins; Tombs; KF: 831 AD; HR	(Author's visiting; Liu and Bai 1980, BJDXKGWBXY et al. 2007, Wang et al. 2006, Huang and Huang 2012, JXSWWKGYJS and JDZMYBWG 2007, Liu 1982, GGBWY et al. 2007a, b, Chen 1973b:48, Peng 1966, Wang 2014c, Yuan 2013)
61	AH	Xiafuqiao 下符桥窑				n	s			Ceramics	(Han and Feng 2012)

KN	Location	Kiln Name	Dating							Dating Evidence	References
62	FJ	Tong’an 同安窑				n	s	y		Ceramics	(Li 1974:82, 84, FJSWWGLWYH 1958, Huo and Lin 2004, XYXBWG 1999, Anonymous 2011)
63	GD	Fengkai 封开窑				n				Ceramics	(He and Zhao 1975)
64	FJ	Shaxian 沙县窑				n				Ceramics	(SXBWG 2011:20)
65	FJ	Xiamen 厦门窑				n	s			Ceramics ; coins : 1119-1125 AD; 1131-1162 AD	(XMSWWGLWYH 1999, Zheng and Cai 1999)
66	FJ	Sanming 三明窑				n	s	y	m	Ceramics	(Ye 2005h, Li 1995b)
67	FJ	Songxi 松溪窑			f	n				Ceramics	(FJSBWG 1982)
68	GD	Huizhou 惠州窑				n				Coins	(Zeng and Wu 1977)
69	GX	Guiping 桂平窑				n				Ceramics; coins: 1096-1100 AD; 1101 AD	(Zhang 1983:518, Chen 1984:200)
70	GX	Rongxian 容县窑					s			Ceramics	(GXZZZZQWWGZD 1987)
71	HUB	Jiangxia 江夏窑				n				Tombs: 1037 AD; 1117 AD	(He et al. 2000)
72	HUB	Husi 湖泗窑				n				Ceramics; Tombs: Song	(WHSWWC 1984)

KN	Location	Kiln Name	Dating							Dating Evidence	References
73	HUN	Chenzhou 郴州窑				n				KF: Northern Song; Ceramics	(Long 1992)
74	HUN	Hongjiang 洪江窑				n				KF: 1089 AD; Ceramics	(HNSWWKGYJS 2006:48-49)
75	SC	Pengxian 彭县窑				n	s			Ceramics ; Coins: Song; Tombs: Song	(SCSWWGLWYH 1983:57)
76	ZJ	Longquan 龙泉窑				n	s	y	m	Ceramics; Tombs; HR; KF; Coins: Song to Ming	(ZJSWWKGYJS 2005, ZJSWWKGYJS et al. 2009, Zhang 1989a, Li et al. 1986, SHBWGKGB 1986, Cao 1984)
77	FJ	Quanzhou 泉州窑				n	s	y	m	Ceramics; Tombs: Song; 1187 AD	(AXXWHG 1977, Zhang 1989b, Li 1960, Lin 1999)
78	HN	Xin'an 新安窑				n	s	y		Ceramics	(HNSBWG 1974:79)
79	HN	Yiyang 宜阳窑				n	s			Ceramics	(HNSWWYJS 1984b:323-325)
80	HN	Ru 汝窑				n	s			Ceramics; HR; Coins	(Sun 2005:3-4, HNSWWYJS 1992:152-153)

KN	Location	Kiln Name	Dating							Dating Evidence	References
81	HN	Linru 临汝窑				n	s	y		Ceramics; coins: 1056-1063; 1078-1085 AD;	(HNSWWKGYJS 1995)
82	SHX	Xunyi 旬邑窑					s			Ceramics；KF: 1228 AD	(XYDQWWGLWYH 1980)
83	SX	Jiexiu 介休窑				n	s			Ceramics; HR	(Wu 1958:36-37)
84	SX	Mengjiajing 孟家井窑				n	s	y	m	Ceramics	(Yang 1964:49)
85	CQ	Tushan 涂山窑					s			Ceramics	(CQSBWG 1991:232)
86	FJ	Zhangzhou 漳州窑				n	s	y	m	Ceramics; coins: 1119-1125 AD, Southern Song to Qing	(FJSBWG 1998:26-27, Zhang 1999, FJSBWG 2001, Ye 2005d, Tang 1999, Wang 1993:253, FJSBWG 1987:123, Ye 2005f:26-27)
87	GD	Qujiang 曲江窑				n				Ceramics	(Wu and Da 2003)
88	FJ	Hui'an 惠安窑					s	y		Ceramics	(FJSBWG 1993:41)
89	FJ	Nan'an 南安窑					s			Ceramics ； Tombs: Song	(Huang 1957:53)
90	FJ	Putian 莆田窑					s	y		Ceramics; HR: Song	(Ke and Chen 1995:612, Li 1979a)
91	FJ	Fuqing 福清窑					s	y		Ceramics	(Ye 2005b)

KN	Location	Kiln Name	Dating							Dating Evidence	References
92	FJ	Yongchun 永春窑					s	y		Ceramics	(Zeng 2001:173)
93	FJ	Zhangping 漳平窑					s	y	m	Ceramics	(Ye 2005i)
94	FJ	Minhou 闽侯窑					s			Ceramics; Tombs: Song; 1187 AD	(Ye 2005e:20-21, Zeng 2001, Wen et al. 2011)
95	GX	Tengxian 藤县窑					s			Ceramics; KF: 1238 AD	(Wei 1984:190-193)
96	GX	Xing'an 兴安窑					s			Ceramics; Datable Ceramics: 1163 AD, 1223 AD	(Li 1991:766)
97	HUN	Yiyang 益阳窑					s	y	m	Ceramics; Datable Materials: 1260- 1264 AD	(Sheng 1983:341-342, Zhou et al. 1984, Zhou 1984a:70-71, 78)
98	JX	Nanfeng 南丰窑				n	s			Ceramics; Tombs: 983 AD; 1160 AD	(JXSWWGZD 1985:231-232, Chen 1963)
99	JX	Nankeng 南坑窑					s	y	m	Ceramics	(JXSWWGZD 1984b:270)
100	SC	Dazhou 达州窑					s			Ceramics	(SCSWWKGYJS 2005:21-22)
101	ZJ	Guan Kilns 官窑					s			Ceramics; HR	(HZSWWKGS 2002)
102	HB	Longhua 隆化窑					s	y		Ceramics	(Li 1985:39)
103	SX	Huozhou 霍州窑					s	y		Ceramics; HR	(Tao 1992:524-525)

KN	Location	Kiln Name	Dating							Dating Evidence	References
104	SX	Changzhi 长治窑					s			Ceramics; Tombs: 1196 AD, 1201-1208 AD; Datable materials: 1201 AD	(SXSKGYJS 1998:24)
105	FJ	Dehua-QB 德化窑					s	y	m	KF: 1307 AD; Ceramics: Yuan-Qing	(DHGCYKGFJGZD 1979:57, FJSBWY et al. 2006, Chen 1999)
106	GD	Raoping 饶平窑						y	m	Ceramics; HR	(He et al. 1984:160-161)
107	GX	Liuzhou 柳州窑				n				Ceramics	(Xie 2000)
108	JX	Hengfeng 横峰窑							m	HR; Ceramics	(Chen 1973a:63)
109	JX	Jing'an 靖安窑						y		Ceramics	(Chen 1986)
110	YN	Yuxi 玉溪窑						y	m	Ceramics	(Ge and Li 1980)
111	YN	Lufeng 禄丰窑							m	Ceramics	(Ge 1990, Li 1989)
112	YN	Jianshui 建水窑							m	Ceramics	(Ge 1987)
113	SX	Yuxian 盂县窑					s			Ceramics; HR	(SXSKGYJS 1999:22)
114	HUN	Huaihua 怀化窑							m	Ceramics	(Zhou 1984a:71-73, 78)
115	GD	Huiyang 惠阳窑							m	Ceramics	(Zeng 1962, 1964b)
116	GD	Boluo 博罗窑							m	Ceramics	(Zeng 1965:22)
117	GD	Jieyang 揭阳窑							m	Ceramics	(Zeng 1965:22)

KN	Location	Kiln Name	Dating							Dating Evidence	References
118	GX	Hepu 合浦窑							m	Ceramics; KF: 1549 AD	(Zheng 1986:1101-1102)
119	HN	Dangyangyu 当阳裕窑				n	s			HR; Ceramics; Coins	(Yang 1997, Feng and Li 2005b:181-213, JZSWWGZD 1995)
120	HN	Pacun 扒村窑	p				s	y		Ceramics	(Feng and Li 2005b:393-429)
121	HN	Qixian 淇县窑						y		Ceramics	(Feng and Li 2005b:337-349)
122	FJ	Nanping 南平窑				n	s	y		Ceramics	(FJSBWG 2000b)
123	FJ	Pucheng 浦城窑					s	y		Ceramics	(Lin and Zhao 1984)
124	HN	Luoyang 洛阳窑	p	t						Ceramics	(Huo 2008, Qian et al. 2005)
125	FJ	Minqing 闽清窑					s	y		Ceramics; KF: 1206 AD	(MQXWHJ and XMDXRLXKGZY 1993)
126	FJ	Lianjiang 连江窑		t		n	s	y		Ceramics	(Li et al. 1994)
127	FJ	Shaowu 邵武窑						y	m	Ceramics	(Fu and Wang 1988)
128	FJ	Ningde 宁德窑					s	y		Ceramics	(Lou 1993)

KN	Location	Kiln Name	Dating							Dating Evidence	References
129	GD	Lei'zhou 雷州窑				n	s	y		Ceramics; Tombs: 1167 AD, 1343 AD	(Song 1991:51-52, Deng 1989, Yang 1988, ZHJSBWG et al. 2003, Yang 2001)
130	GD	Nanhai 南海窑					s	y		Ceramics	(Song 1991:53, GDSWWH 1959)
131	GD	Longjingkeng 龙颈坑窑					s			Ceramics	(Qiu 1996)
132	GD	Heyuan 河源窑				n	s			Ceramics	(Liu 1997)
133	HUN	Hengshan 衡山窑			f	n	s	y		Ceramics; tombs	(Zhou and Zheng 1985, Zhou 1984c)
134	ZJ	Longyou 龙游窑	p							Ceramics	(Zhu 1995, Gong 1989)
135	ZJ	Xiangshan 象山窑	p							Ceramics	(Li 1979b)
136	JX	Quan’nan 全南窑			f	n	s	y		Ceramics	(Xue and Liu 1996, Shi 1984)
137	HUN	Lingling 零陵窑				n				Ceramics； KF: 1045 AD	(Zhou and Feng 1984, Zhou 1984c:51-52)
138	JX	Nancheng 南城窑				n	s			Ceramics	(Hu 1964)
139	SC	Guangyuan 广元窑				n	s			Ceramics; Tombs	(SCSWWKGYJS and GYSWWBHGLS 2003, CQSBWG 1984)

KN	**Location**	**Kiln Name**	**Dating**							**Dating Evidence**	**References**
140	GX	Beihai 北海窑							m	Ceramics; Datable Materials	(Deng 2003)

Appendix 2:

Dataset 2: Ceramic classes produced from Key ceramic kiln sites

This dataset presents an extensive collected data of the important and key Chinese archaeological sites of ceramic kilns in China, which are dated between the 6th and 16th centuries. For each collected kiln site, this dataset provides information about their produced ceramic classes of different periods. From this dataset, it can be seen that there are five periods during the age from the 6th to the 17th centuries. Each period provides the ceramic class/classes that produced from these 140 kiln sites. Their kiln-site numbers are following dataset 1 (Appendix 1). There are 12 classes of ceramics that have been reported by these archaeological missions/excavations of these 140 kiln sites. These classes are: ***G= GREEN/CELADON (绿、青釉), Y= YELLOW/BROWNISH YELLOW WARES (黄、酱黄), B= BLACK WARES (黑釉), F= CIZHOU TYPE WARES (磁州风格), C= BLUE AND WHITE CERAMICS (青花), W= WHITE WARES (白釉), P= POLYCHROME WARES (釉下彩), S= GREEN SPLASHED/SANCAI WARES (白釉绿彩、三彩), Q= QINGBAI WARES (青白), E= ENAMEL (釉上彩), J=JUN CELADON (钧釉器) and O= OTHER (其他种类).*** *The definitions of these classes can be found in Chapter 2: 2.5.2-(1).*

KN	Pre-Tang to early Tang (6th to 7th centuries)				Middle Tang (8th to 9th centuries)					Five Dynasties (~10th century)				Northern Song (11th to 12th centuries)						Southern Song (~12th to 13th centuries)					Yuan 1274-1368 AD						Ming 1368-1644 AD					
1	G	Y			Y	G	B																													
2	G				Y	G				Y	G			G	B	Y				G	B	Y			G	B	Y									
3	G				G	P																														
4	G	Y			G	Y				G	Y			G	Y					G	Y															
5	G	Y			G	Y				G	Y			G	Y																					
6	G				G																															
7	G	Y																																		
8	G	Y			G	Y				G	Y																									
9	G	W			G					G				B	Y					B	Y				G	Y					B	G	C	Q		
10					G	Y				G	Y			G	Y																					
11	G	Y			G	Y																														
12	G	B																																		
13	G				G					G				G						G																
14	G				G					G				G						G	B	J			G	B	J									
15	G				G					G				G																						
16	G									W	B	F		W	B	F				W	B	F	S		W	B	F	E			B	W	F			
17	W	B	Y		G	W	Y	S		W	Y	S		W	Y					W	Y	B														
18	G			W	W	B	S	C	O																											
19	B	Y	W	G	B	Y	W	G																												
20	G	Y			B									W	S					G	J				J											
21	G	Y			G	Y	B	W																												

KN	Pre-Tang to early Tang (6th to 7th centuries)				Middle Tang (8th to 9th centuries)					Five Dynasties (~10th century)				Northern Song (11th to 12th centuries)						Southern Song (~12th to 13th centuries)					Yuan 1274-1368 AD						Ming 1368-1644 AD					
22	G				G					G				G	W					G	W	B	Y		W	B					B					
23	G	B			G	B				W	G			W	G	B	O			B	W	F	Y	E												
24					G																															
25					G					G				G						G																
26					G	Y				G				G						G																
27					G					G				G						G																
28					B	G				G				B						B	Q				Q											
29	G				G	Y				G	Y			G	Q																					
30					Y									Y	B	G				Y	B	G	Q													
31					G	Y																														
32					G	Y								G	B	Y																				
33														W	Q	G	Y	P																		
34					G	Y																														
35					G															G	Q	Y														
36					G	Y								G	B	Y															J					
37					G	Y				G	Y			G	Y																					
38					G	P	Y																													
39					W	G	Y	P		W	G			G	Q					G	Q	B	Y		G	Q	B	Y								
40					Y	B	W	G		W	B			W	B	Y	G			W					W											
41					W	B	Y			W	B	Y	O	W	B	Y	O			W	B	Y	O		W	B	Y	O								
42					W	B	Y	S																												

KN	Pre-Tang to early Tang (6th to 7th centuries)				Middle Tang (8th to 9th centuries)					Five Dynasties (~10th century)				Northern Song (11th to 12th centuries)						Southern Song (~12th to 13th centuries)					Yuan 1274-1368 AD						Ming 1368-1644 AD					
43					B	S				B	S			B	G	W	S	J	F	B	J				B	F	W	S	Y	J						
44					W	G	B	Y		W	G	B	Y	W	G	B	Y																			
45					B	Y	W			W	S	F		F	S	G	J			G	E	J	F		J	E										
46					W	Y	B			W	B			W	Y	B	G			W	B				W	B	O	E								
47					G	B	Y							J	W	B				J	G	W	B		J	G	W	B	F							
48					G	B	W			G				G						G					G											
49					W	B	Y	S						S	W	F				F					F											
50					B	W	Y	G		G				G	B	Y				G	B	Y			G	B	F				B	W	F			
51					W	B	Y			W	B	Y		W	B	Y				B	W	Y	O		B	W	Y	O								
52					W	B				W	B			W	B					W	B															
53										Q				Q																						
54										G				G																						
55										G	Q			G	Q																					
56										G	Y			Q	Y																					
57					G					G				G																						
58										W				W	B	Q				F	Q				F	G	Q				W	C				
59					G	Y				G	W			W	B	Q				W	B	F	Y		W	B	F	Y								
60										G	W			Q	B	Y				Q					Q	C	G				G	W	C	O	Q	E
61														B						B																
62														G						G	W				G	W										
63														G																	C					

KN	Pre-Tang to early Tang (6th to 7th centuries)				Middle Tang (8th to 9th centuries)					Five Dynasties (~10th century)				Northern Song (11th to 12th centuries)						Southern Song (~12th to 13th centuries)					Yuan 1274-1368 AD						Ming 1368-1644 AD					
64														G	Y	Q																				
65														G	Y	B	Q			G	Y	B	Q													
66														Q						Q	G	Y			Q	Y					Q					
67										G				G	Y	B																				
68														G	Q	Y	W																			
69														Q	Y																					
70																				Q	B	Y	O													
71														Q	G	W	Y																			
72														Q																						
73														Q																						
74														G																						
75														W						W																
76														G						G					G						G					
77														G						G	Q				G	Q					C					
78														G						G	F				J	G	W									
79														G	F					G	F															
80														G						W	F															
81														W	G	J				J	G	Y	F		J											
82																				G																
83														W	B	G	O			W	B	G	O													
84														W	B	G	O			W	B	G	O		B	W					B	W				

KN	Pre-Tang to early Tang (6^{th} to 7^{th} centuries)				Middle Tang (8^{th} to 9^{th} centuries)					Five Dynasties (~10^{th} century)				Northern Song (11^{th} to 12^{th} centuries)						Southern Song (~12^{th} to 13^{th} centuries)					Yuan 1274-1368 AD						Ming 1368-1644 AD					
85																				B	Y															
86														G	Q					B	G	Y	W	Q	G						C	G	W	Q	E	
87														G	B	Y																				
88																				Y	G	W	Q		Y	G	W	Q								
89																				Y	G	Q	B													
90																				Q	G				Q	G										
91																				B	G	F			Q	G										
92																				Q					Q											
93																				Q					Q						C					
94																				B	G															
95																				Q	Y															
96																				G	Q	Y	B													
97																				Q	G	B			Q	G	B				C					
98														Q						Q	B															
99																				Q					G						C					
100																				G																
101																				G					G											
102																				W	B				W	B										
103																				W					W											
104																				W	B	E														
105																				Q					Q						W					

KN	Pre-Tang to early Tang (6^{th} to 7^{th} centuries)				Middle Tang (8^{th} to 9^{th} centuries)					Five Dynasties (~10^{th} century)				Northern Song (11^{th} to 12^{th} centuries)						Southern Song (~12^{th} to 13^{th} centuries)					Yuan 1274-1368 AD						Ming 1368-1644 AD					
106																									G						C					
107														G																						
108																															G					
109																									Q	G										
110																									G						C					
111																															C	G	Q			
112																															C	G				
113																				W	B	O														
114																															C					
115																															G	Q	W	Y		
116																															C					
117																															C					
118																															G					
119														F	W	Y	S	O		F	W	Y	S	O												
120	G																			J	G	F	E		F	E	S									
121																									J											
122														G	Q	Y				Y	B	Q			Q	G	B									
123																				G	Y	Q			B	G	Q									
124	Y	G	B	W	S	Y	G	B	W																											
125																				Q	B				Q	B										
126					G									G						G	Q	B			Q	G	B									

KN	Pre-Tang to early Tang (6th to 7th centuries)				Middle Tang (8th to 9th centuries)					Five Dynasties (~10th century)				Northern Song (11th to 12th centuries)						Southern Song (~12th to 13th centuries)					Yuan 1274-1368 AD						Ming 1368-1644 AD					
127																										Q	G	B	Y			Q	G	B	Y		
128																					Y	W	Q			Y	W	Q									
129														P						P					P						P					
130																				P					P											
131																				G	Q	Y														
132														G	Y					G	Y															
133										Y				P						P					P											
134	J																																			
135	J	G	P																																	
136										G	Q			G	Q					G	Q	B	W		G	Q	B	W								
137														Y																						
138														G	Q	B				G	Q	B														
139														B	Y	F				B	Y	F														
140																															G					

Appendix 3:

Dataset 3: Key Archaeological Sites in the Western Indian Ocean.

*This dataset presents the extensive collected data of the important and key archaeological sites in the western Indian Ocean, which are dated from the 6th to 16th centuries. For each collected site, there are two parts to provide the information collected from the site report. The higher part provides the information that consists of '**site type'** (inland site or coastal site), '**Location'** (city locations of these sites), '**Published Photos'** (photos of Chinese ceramic finds: true= published, false= unpublished), '**Excavation/Survey'** (archaeological mission types of these sites), '**Site Dating**' (reported dating periods of these sites) and **References**. The lower part titled by '**Unearthed Chinese Ceramics**' aims to show the unearthed Chinese ceramic finding assemblages, which includes the '**Class**' (reported ceramic classes by ceramic appearances), '**Kiln Site**' (possible producers of this ceramic assemblage), '**Quantity**' (how many sherds are in this assemblage), '**Quality**' (ceramic fabrics: e.g. pottery, stoneware or porcelain) and '**Ceramic Dating**' (possible dating periods of this ceramic assemblage). Among this information, the definitions of 'class' are based on these archaeological reports. The definitions of these classes can be seen in Chapter 2: 2.5.2-(1). In terms of 'Kiln Sites', they are **JDZ=Jingdezhen Kilns, LQ=Longquan Kilns, DH=Dehua Kilns, YUE=Yue Kilns, ZZ=Zhangzhou Kilns, CS=Changsha Kilns, XING=Xing Kilns, GY=Gongyi Kilns, DING=Ding Kilns, YZ=Yaozhou Kilns, JIAN=Jian Kilns, XICUN=Xicun Kilns, CZ=Cizhou Kilns, Fujian=Fujian Local Kilns, Guangdong=Guangdong Local Kilns, MTB=Martabani Wares, Dusun=Dusun wares, Northern China= Northern Chinese Local Kilns and Southern China= Southern Chinese Local Kilns.** In terms of '**Quantity'**, it can be seen descriptive numbers (such as 'small', 'some', 'common' or 'large'), which are not reported in detailed numbers. It also can be seen the approximate numbers (e.g. '10?'), they are reported in a rough quantity. In this dataset, it can be found the mark of '?', which means not reported and unsure. 'Kangxi Period = 1661-1722 AD'*

**: It should be noticed that there are some inconsistencies between the two studies of the Chinese material of Siraf ceramic collection (Tampoe 1989; Priestman 2013). It will need to be resolved by a further and fully examination of these Chinese sherds in future studies.*

Site 1: Mahasthangarh, Bangladesh

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Inland Site	-	True	Excavation	Pre-History to 18th Centuries	Unpublished: Author's data

Site 1: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Enamelled	JDZ	4	Porcelain	16th Century	17
Blue and White	JDZ	3	Porcelain	16th to 17th Century	
Celadon	LQ	9	Stoneware	13th to 14th Centuries	
White	DH?	1	Porcelain	16th to17th Centuries	

Site 2: Tughlaq Palace, India

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Inland Site	Delhi	True	Excavation	Historical Texts (1354-1398)	(Smart 1977)

Site 2: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Blue and White	JDZ	67	Porcelain	14th Century	72
Celadon	LQ	5	Stoneware		

Site 3: Kilakkarai, India

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site	Tamilnadu	False	?	14th Century	(Subbarayalu 1996)

Site 3: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
?	?	A few	?	14th Century	?

Site 4: Periyapattinam, India

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference

Coastal Site	Tamilnadu	Partly True	Excavation	Coin (13th to 14th Centuries)	(Subbarayalu 1996, Karashima 2004:22-23, Aoyagi and Kanazawa 1980)
Site 4: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	LQ	about 900	Good	14th Century	about 1,500
Celadon	?		Stoneware	14th Century	
Blue and White	JDZ	about 150	Porcelain	14th Century	
White	DH?	about 225	Stoneware	14th Century	
Brown Glazed	?	about 150	Stoneware	14th Century	
Site 5: Palaya-Kayal, India					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site	Tamilnadu	False	Survey?	14th Century	(Subbarayalu 1996:24-26, Karashima 2004)
Site 5: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Blue and White	JDZ	1	Porcelain	14th Century	Near 200?
Celadon	LQ	?	Stoneware	14th Century	
Celadon	Fujian?	?	Stoneware	14th Century	
Brown Glazed	Guangdong?	?	Stoneware	14th Century	
White (and Qingbai)	DH	A few	Porcelain	14th Century	
Qingbai	Fujian?	9	Stoneware	12th to 13th Centuries	
Site 6: Arikamedu, India					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site	Tamilnadu	False	Survey	11th to 15th Centuries (and later)	(Subbarayalu 1996)

Site 6: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	?	?	Stoneware	11th to 13th Centuries?	?
?	?	?	?	Pre-15th Century	

Site 7: Gangaikondacholapuram, India					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Inland Site	Tiruchirapalli	False	Excavation	1012-1044 AD	(Subbarayalu 1996, Karashima 2004:37-38)

Site 7: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Qingbai	?	Some	Stoneware	11th to 12th Centuries	About 40?
White	?	Some	Stoneware		

Site 8: Darasuram, India					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Inland Site	Kumbakonam	False	?	11th 12th Centuries	(Subbarayalu 1996, Karashima 2004:35)

Site 8: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	YUE	?	Stoneware	11th 12th Centuries	?
Celadon	LQ	?	Stoneware		
White/Qingbai?	JDZ	3?	Stoneware		

Site 9: Settur, India					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Inland Site	Tamilnadu	False	Excavation	13th to 14th Centuries	(Subbarayalu 1996, Karashima

					2004:27)

Site 9: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	?	1	Stoneware	13^{th} to 14^{th} Centuries	1

Site 10: Vellore Fort					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Inland Site	North Arcot	False	?	?	(Subbarayalu 1996)

Site 10: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Blue and White	?	?	Porcelain	15^{th} to 20^{th} Centuries?	?
Enamelled	?	?	Porcelain		

Site 11: Kannur, India					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Port	Kerala	False	?	?	(Subbarayalu 1996, Karashima 2004:48)

Site 11: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Blue and White	?	8	Porcelain	17^{th} to 18^{th} Centuries	8?

Site 12: Dharmadam, India					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Port	Kerala	False	?	?	(Subbarayalu 1996, Karashima 2004:48)

Site 12: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity

Blue and White	?	37	Porcelain	17th to 18th Centuries	37

Site 13: Mahe, India					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Port	Kerala	False	?	?	(Subbarayalu 1996, Karashima 2004:48)

Site 13: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
?	?	1	Porcelain	17th to 18th Centuries	1

Site 14: Quilandi, India					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Port	Kerala	False	?	?	(Subbarayalu 1996)

Site 14: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
?	?	?	Porcelain	17th to 18th Centuries	?

Site 15: Ponnani, India					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Port	Kerala	False	?	?	(Subbarayalu 1996, Karashima 2004:49)

Site 15: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Blue and White	?	7	Porcelain	17th to 18th Centuries	?

Site 16: Kodungallur, India					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Port	Kerala	False	?	?	(Subbarayalu 1996)

Site 16: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	?	2	Stoneware	13th to 14th Centuries	29?
Blue and White	?	27	Porcelain	17th to 18th Centuries	

Site 17: Pandalayini, India					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Port	Kerala	False	Trial Excavation	13th to 14th Centuries	(Subbarayalu 1996)

Site 17: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	LQ	?	Stoneware	13th to 14th Centuries	?
Shufu	JDZ	?	Porcelain		

Site 18: Kollam, India					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Port	Kerala	False	Survey	13th to 16th Centuries	(Subbarayalu 1996, Karashima 2004:48)

Site 18: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	LQ	73?	Stoneware	13th to 16th Centuries	Over 500?
Celadon	Fujian?		Stoneware		
White	?	1	?		
Brown glazed	?	12	Stoneware		
Enameled	?	4	Porcelain		
Blue and White	JDZ	460?	Porcelain		

Site 19: Tangasseri, India

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site	Sub-Kollam	False	Survey	13^{th} to 17^{th} Centuries	(Subbarayalu 1996, Karashima 2004:49)

Site 19: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Enameled	?	1	Porcelain	16^{th} to 17^{th} Centuries?	
Brown glazed	?	3	Stoneware	?	
White	DH	2	?	?	124?
White	?	1	?	?	
Blue and White	JDZ	92?	Porcelain	16^{th} to 17^{th} Centuries	
Celadon	LQ?	25?	Stoneware	13^{th} to 14^{th} Centuries	

Site 20: Calicut, India

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site	Kerala	False	Survey	?	(Subbarayalu 1996)

Site 20: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
?	?	A few	?	?	?

Site 21: Machilipatnam, India

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		True	Survey	14^{th} to 19^{th} Centuries	(Karashima 2004:3-4)

Site 21: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Blue and White	ZZ	2	Porcelain	17^{th} to 18^{th} Centuries	
Blue and White	JDZ	11	Porcelain	17^{th} to 18^{th} Centuries	26 (Totally 300)
White	ZZ	3	Porcelain	17^{th} to 18^{th} Centuries	

Celadon	ZZ	5	Stoneware	17^{th} to 18^{th} Centuries	
Celadon	?	2	Stoneware	?	
Enameled	ZZ	2	Porcelain	17^{th} to 18^{th} Centuries	
Grey glazed	?	1	Stoneware	?	

Site 22: Motupalli, India

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		True	Survey	13^{th} to 18^{th} Centuries	(Karashima 2004:4-6)

Site 22: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	LQ	10	Stoneware	13^{th} to 14^{th} Centuries	
Celadon	Fujian?	1	Stoneware	13^{th} to 14^{th} Centuries	
White	DH	1	Stoneware	13^{th} to 14^{th} Centuries	
Qingbai	DH	1	Stoneware	13^{th} to 14^{th} Centuries	18
Blue glazed	DH	1	Stoneware	13^{th} to 14^{th} Centuries	(Totally 50)
Brown glazed	Guangdong?	1	Stoneware	13^{th} to 14^{th} Centuries	
Blue and White	JDZ?	2	Porcelain	17^{th} to 18^{th} Centuries	

Site 23: Kottapatnam, India

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		True	Survey	?	(Karashima 2004:7-8)

Site 23: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	LQ	6	Stoneware	13^{th} to 15^{th} Centuries	
White	?	1	Stoneware	14^{th} /15^{th} Century	9
Celadon/White	Fujian?	1	Stoneware	14^{th} Century	(Totally about 200)
Blue and White	Guangdong/Fujian?	1	Porcelain	16^{th} to 17^{th} Century	

Site 24: Pulicat, India					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		True	Survey	About 11th to 16th Centuries	(Karashima 2004:8-9)

Site 24: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Enameled	?	1	Porcelain	?	24
Blue and White	ZZ	9	Porcelain	16th to 17th Centuries	
Blue and White	JDZ	3	Porcelain	16th to 17th Centuries	
Blue and White	Guangdong/Fujian?	5	Porcelain	16th to 17th Centuries	
White	Southern China?	4	Stoneware	15th to 17th Centuries	
Celadon?	Fujian/Not Chinese?	2	Stoneware	14th to 16th Centuries	

Site 25: Nagapattinam, India					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		True	Survey	11th to 12th Centuries	(Karashima 2004:23)

Site 25: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Blue and White	?	About 10	Porcelain	16th Century and After	About 10

Site 26: Devipattinam, India					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		False	Survey	?	(Karashima 2004:23-24)

Site 26: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Blue and White	?	30	Porcelain	16th Century and After	30

Site 27: Kulasekarapattinam, India

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		True	Survey	13^{th} to 15^{th} Centuries	(Karashima 2004:26)

Site 27: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Blue and White	JDZ	3	Porcelain	16^{th} to 17^{th} Centuries	
Blue and White	Guangdong\Fujian?	2	Porcelain	17^{th} to 18^{th} Centuries	
White	JDZ	7	Porcelain	16^{th} to 17^{th} Centuries	15
Celadon	?	1	Stoneware	?	
Celadon	LQ	2	Stoneware	14^{th} Century and After	

Site 28: Kunnattur, India

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Inland Site		True	Survey?	?	(Karashima 2004:27)

Site 28: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	LQ	13	Stoneware	14^{th} Century	
White	DH	1	Stoneware	14^{th} Century	15
Brown Glazed	?	1		14^{th} Century	

Site 29: Pondicherry, India

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		True	Excavation	?	(Karashima 2004:34)

Site 29: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	LQ	18	Stoneware	14^{th} to 15^{th} Centuries	
Celadon	Fujian?	4	Stoneware	14^{th} to 15^{th} Centuries	35
White	Fujian?	8	Stoneware	14^{th} to 15^{th} Centuries	

Blue and White	JDZ/Guangdong?	5	Porcelain	18th to 19th Centuries	

Site 30: Velur, India

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Inland Site	Chennai	True	Survey?	?	(Karashima 2004:35)

Site 30: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Blue and White	JDZ	10	Porcelain	17th to 18th Centuries	10

Site 31: Golkonda, India

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Inland Site	Hyderabad	True	Survey	?	(Karashima 2004:36)

Site 31: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Blue and White	JDZ	8	Porcelain	16th to 17th Centuries	9
Celadon	LQ	1	Stoneware	16th Century?	

Site 32: Sadras, India

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		True	Survey	14th to 18th Centuries	(Karashima 2004:36)

Site 32: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Blue and White	JDZ	7	Porcelain	17th to 18th Centuries	10
Blue and White	?	3	Porcelain	17th to 18th Centuries	

Site 33: Anjengo, India

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		False	Survey?	?	(Karashima 2004:49)

Site 33: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Blue and White	?	5	Porcelain	?	6
Enameled	?	1	Porcelain	?	

Site 34: Sanjan, India					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site	Gujarat	True	Excavation/Survey	7th to 13th Centuries	(Nanji 2011); Author's examination

Site 34: Unearthed Chinese Ceramics (Based on author's examination)					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Polychrome	CS	4	Stoneware	8th to 9th Centuries	
Brown glazed	Dusun	12	Stoneware	8th to 9th Centuries	
Celadon	YUE	10	Stoneware	8th to 12th Centuries	
Celadon	YUE?	5	Stoneware	8th to 12th Centuries	
Celadon	LQ	1	Stoneware	13th to 14th Centuries	43
White	XING	7	Stoneware	8th to 9th Centuries	
Qingbai	JDZ	1	Stoneware	11th to 12th Centuries	
Blue and White	JDZ	2	Porcelain	13th to 14th Centuries	
Fine Green glazed	?	1	Stoneware	?	

Site 35: Pattanam, India					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site	Kerala	False	Excavation		Unpublished: Author's examination

Site 35: Unearthed Chinese Ceramics (based on author's examination)					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
White	DH	11	Porcelain	17th to 18th Centuries	72
White	?	8	Porcelain	17th to 18th Centuries?	

Blue and White	JDZ	14	Porcelain	17th to 18th Centuries	
Blue and White	?	38	Porcelain	17th to 18th Centuries	
Qingbai	DH	1	Stoneware	13th to 14th Centuries	

Site 36: Old Goa, India

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		False	Excavation	15th to 17th Centuries	(Tripati et al. 2011:112,115)

Site 36: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Blue and White	JDZ	26	Porcelain	16th to 17th Centuries	26

Site 37: Vadodara, India

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site	Gujarat	False	Survey	unknown	Unpublished: Author's examination

Site 37: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	LQ	9	Stoneware	14th to 16th Centuries	16
Celadon	Guangdong?	3	Stoneware	14th Century	
Blue and White	JDZ	2	Porcelain	14th to 16th Centuries	
?	?	2	Stoneware	?	

Site 38: Manikapatana, India

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		False	Excavation	unknown	Unpublished: Author's examination

Site 38: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Blue and White	JDZ	1	Porcelain	14th Century	

Blue and White	JDZ	9	Porcelain	15th to 16th Centuries	46
Celadon	Southern China?	6	Stoneware	12th to 13th Centuries?	
Celadon	LQ	12	Stoneware	13th to 15th Centuries	
White	JDZ	3	Porcelain	15th to 16th Centuries	
Qingbai	JDZ	8	Stoneware	12th to13th Centuries	
Enamelled	JDZ	2	Porcelain	15th to 16th Centuries	
White	Southern China?	4	Porcelain?	16th Century	
?	?	1	Stoneware	?	

Site 39: Mantai, Sri Lanka

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		True	Excavation	Historical period to 9th Century	(Carswell et al. 2013, Prickett-Fernando 1994, Karashima 2004); Author's examination

Site 39: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	YUE	340	Stoneware	8th to 10th Centuries	Over 2,000
Brown glazed	Dusun	1164	Stoneware	8th to 9th Centuries	
Polychrome	CS	416	Stoneware	8th to 9th Centuries	
Green Splashed	GY	about 50?	Stoneware	8th to 9th Centuries	
White	XING		Stoneware	8th to 9th Centuries	
White	DING		Stoneware	8th to 9th Centuries	
White	GY?	about 200?	Stoneware	8th to 9th Centuries	
White	?		Stoneware	8th to 9th Centuries	
Qingbai	JDZ?		Stoneware	8th to 9th Centuries	
Sancai	GY	2?	High fired pottery	8th to 9th Centuries	

Brown Glazed	?	Many	Stoneware	?	

Site 40: Polonnaruwa, Sri Lanka					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Inland Site		True	Excavation	10^{th} to 12^{th} Centuries	(Karashima 2004:62-63, Prickett-Fernando 1994, Prematilleke 1990)

Site 40: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Black glazed	JIAN	1	Stoneware	12^{th} Century	Over 100?
Celadon	YUE	Less than 10	Stoneware	11^{th} to 13^{th} Centuries	
Celadon	LQ	Less than 10	Stoneware	11^{th} to 13^{th} Centuries	
White	JDZ	Less than 10	Stoneware	11^{th} to 13^{th} Centuries	
Qingbai	JDZ	Less than 10	Stoneware	11^{th} to 13^{th} Centuries	
Qingbai/White	DH	Less than 10	Stoneware	11^{th} to 13^{th} Centuries	
Brown Glazed	?	Less than 10	Stoneware	11^{th} to 13^{th} Centuries	

Site 41: Panduwasnuvara, Sri Lanka					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Inland		False	Survey?	Historical Text (1153-1186 AD)?	(Prickett-Fernando 1994)

Site 41: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon?	LQ?	Less than 10?	Stoneware	12^{th} to 13^{th} Centuries	Less than 10?

Site 42: Dedigama, Sri Lanka					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Inland Site		False	Excavation	Historical Text (12^{th} Century)	(Prickett-Fernando 1994)

				Coins (early 13th Century)	

Site 42: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	?	2	Stoneware	12th to 13th Centuries	2

Site 43: Allaippiddi, Sri Lanka

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		False	Excavation	?	(Prickett-Fernando 1994, Carswell 1985)

Site 43: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Qingbai	?	Over 100	Stoneware	11th to 12th Centuries	Near 500?
Celadon	XICUN	Over 100	Stoneware	11th to 12th Centuries	

Site 44: Vankalai, Sri Lanka

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		False	Survey?		(Prickett-Fernando 1994, Carswell 1985, 1978)

Site 44: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
White	?	?	Stoneware	11th to 13th Centuries?	Over 10?
Celadon	?	1?	Stoneware	11th to 12th Centuries?	

Site 45: Yapahuwa, Sri Lanka

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Inland Site		True	Excavation & Survey	13th to 16th Centuries Coins (7th to 13th Centuries)	(Karashima 2004:57-58, Prickett-Fernando 1994)

Site 45: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Polychrome	CS	2	Stoneware	9th to 10th Centuries	
Green splahsed	GY	5	High fired pottery	9th to 10th Centuries	
Brown glazed	Guangdong?	3	Stoneware	13th to 14th Centuries?	
Celadon	YUE	3	Stoneware	9th to 10th Centuries	18
Celadon	YZ	1	Stoneware	11th to 12th Centuries?	
Celadon	LQ	2	Stoneware	12th to 14th Centuries?	
White	Guangdong/Fujian?	2	Stoneware	13th to 14th Centuries	

Site 46: Nilaveli, Sri Lanka					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		False	Survey	13th to 14th Centuries?	(Prickett-Fernando 1994, Carswell 1985)

Site 46: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	LQ	Over 100	Stoneware	13th to 14th Centuries	Over 100

Site 47: Galle Harbour, Sri Lanka					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		False	Survey?	16th to 17th Centuries	(Prickett-Fernando 1994, Fernando 1990)

Site 47: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	LQ	2	Stoneware	13th Century	Over 10?
?	?	?	?	16th to 17th Centuries	

Site 48: Anuradhapura, Sri Lanka					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Inland Site		False	Excavation	Pre-History to 11th Century	(Prickett-Fernando 1994, Ratnayake 1984, Coningham et al. 1999, 2006)

Site 48: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	YUE	? (6)	Stoneware	9th to 10th Centuries	47 (21) (Round brackets show the sherd counts from Coningham, 2006)
White	Northern China	(11)	Stoneware	9th to 10th Centuries	
Polychrome	Changsha	? (3)	Stoneware	9th to 10th Centuries	
Brown glazed	Guangdong?	? (1)	Stoneware	9th to 10th Centuries	

Site 49: Sigiriya, Sri Lanka					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Inland Site		False	Excavation	5th to 13th Centuries	(Prickett-Fernando 1994)

Site 49: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	LQ	1	Stoneware	13th Century?	1

Site 50: Male, Maldives					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
?	Male based	True	Survey	?	(Carswell 1977)

Site 50: Unearthed Chinese Ceramics					
Class	Kiln Site (Kiln Number)	Quantity (Sherds)	Quality (Body Fabric)	Ceramic Dating	Total Quantity (Sherds)
Blue and White	JDZ	2	Porcelain	14th Century	766
Blue and White	?	?	Porcelain	?	

Blue and White	DH?	?	Porcelain	17th and later?	
Celadon	LQ	?	Stoneware	?	
Celadon	?	?	Stoneware	?	
Brown Glazed	?	?	Stoneware	?	

Site 51: Banbhore, Pakistan

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site	Gharo Creek	True	Excavation	2nd Century BC to 13th Century AD	(Khan 1969:40, Willetts 1960)

Site 51: Unearthed Chinese Ceramics (based on published photos)

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Polychrome	CS	?	?	8th to 9th Centuries	
Celadon	YUE?	?	?	8th to 10th Centuries?	
Qingbai	JDZ	?	?	11th to 13th Centuries?	?
Blue-green glazed jar	MTB?	?	?	8th to 10th Centuries?	
Brown glazed jar	Dusun	?	?	8th to 9th Centuries	

Site 52: Minab, Iran

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal	Southern Iran	True	Survey/Excavation	All period	(Priestman and Kennet 2002, Priestman 2005)

52 Site: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Polychrome	CS	3	Stoneware	8th to 10th Centuries	
White	Southern China	9	Stoneware	14th to 20th Centuries	
White	Southern China?	6	Stoneware	9th to 10th Centuries	
White	Southern China	72	Stoneware	10th to 13th Centuries	1,940
White	Guangdong?	7	Stoneware	11th to 13th Centuries	

White	Southern China	15	Stoneware	14th to 17th Centuries	
White	Fujian	4	Stoneware	10th to 12th Centuries	
White	JDZ	2	Stoneware	14th Century	
Brown glazed	Dusun	14	Stoneware	8th to 10th Centuries	
Brown glazed	MTB	295	Stoneware	14th to 17th Centuries	
Qingbai	Dehua	80	Stoneware	12th to 13th Centuries	
Qingbai	JDZ	54	Stoneware	11th to 13th Centuries	
Celadon	Guangdong	28	Stoneware	11th to 15th Centuries	
Blue and White	JDZ	2	Porcelain	14th century	
Blue and White	JDZ	577	Porcelain	16th Century	
Blue and White	JDZ	58	Porcelain	17th to 20th centuries	
Blue and White	Southern China	65	Porcelain	17th to 20th centuries	
Celadon	LQ	328	Stoneware	13th to 14th centuries	
Celadon	LQ	317	Stoneware	14th to 15th centuries	
?	?	4	Porcelain?	?	

Site 53: Hormuz Island, Iran

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		True	Survey	13th to 17th Centuries	(Wiesner 1979, Priestman 2005)

Site 53: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Blue and White	JDZ	10	Porcelain	14th Century	
Blue and White	JDZ	11	Porcelain	15th Century	
Blue and White	JDZ	About 430	Porcelain	16th Century	586
Blue and White	JDZ	27	Porcelain	17th to 20th Centuries	
Blue and White	Southern China	4	Porcelain	17th to 20th Centuries	

Qingbai	JDZ	2	Stoneware	11th to 13th centuries
Qingbai	Southern China	4	Pottery	18th century
Brown glazed	?	42	Stoneware	?
Celadon	JDZ	1	Stoneware	15th to 16th centuries
Celadon	LQ	13	Stoneware	13th to 14th centuries
Celadon	LQ	26	Stoneware	14th to 15th centuries
White	Southern China	1	Stoneware?	?
White	Southern China	1	Stoneware?	16th to 17th centuries
White	Southern China	5	Porcelain	16th to 17th centuries
White	Southern China	1	Stoneware?	18th Century
White	JDZ	1	Stoneware?	16th Century
White	JDZ	2	Stoneware?	17th Century

Site 54: Siraf, Iran*

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		False	Excavation	Early Islamic-16th century	(Tampoe 1989)

Site 54: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Polychrome	CS	57	Stoneware	8th to 10th centuries	
Celadon	YUE/YZ/LQ	74	Stoneware	8th to 14th centuries	
Blue and White	GY/JDZ	2	Stoneware/Porcelain	8th to 10th and 16th centuries	372
White	Northern China	132	Stoneware	8th to 10th centuries	
Green splashed	GY	19	Stoneware	8th to 10th centuries	
Brown glazed	Dusun	73	Stoneware	8th to 10th centuries	

Site 55: Bushier, Iran

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference

Coastal Site	False	Survey	?		(Priestman 2005, Mori 2008)

Site 56: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Polychrome	GY	3	High Fired Pottery	8th to 9th centuries	
White	Southern China	1	Porcelain	18th centuries	
White	Southern China	1	Stoneware	10th to 12th centuries	
White	GY	4	Stoneware	8th to 9th centuries	
White	XING	2	Stoneware	8th to 9th centuries	
White	Fujian	12	Stoneware	11th to 13th centuries	
White	Fujian	3	Stoneware	14th centuries	
Qingbai	JDZ	8	Stoneware	11th to 12th Centuries	
Celadon	Fujian	4	Stoneware	14th century	
Celadon	YUE	9	Stoneware	8th to 9th centuries	
Celadon	Guangdong	10	Stoneware	8th to 10th Centuries	170
Celadon	LQ	41	Stoneware	13th to 14th centuries	
Celadon	LQ	20	Stoneware	14th to 15th centuries	
Blue and White	JDZ	1	Porcelain	14th Century	
Blue and White	JDZ	33	Porcelain	16th Century	
Blue and White	JDZ	1	Porcelain	15th Century	
Blue and White	JDZ	3	Porcelain	17th to 20th centuries	
Blue and White	Southern China	3	Porcelain	17th to 20th centuries	
Brown glazed	Dusun	1	Stoneware	8th to 9th centuries	
Brown glazed	MTB	2	Stoneware	14th to 17th centuries	
Brown glazed	?	8	Stoneware	?	

Site 56: A'ali, Bahrain

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Inland Site		False	Excavation	9^{th} to 11^{th} Centuries?	(Sasaki 1990:113)

Site 56: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
White	Southern China?	1	Stoneware	10^{th} Century?	3
Brown glazed	Dusun	2	Stoneware	9^{th} to 11^{th} Centuries	

Site 57: Bahrain Survey, Bahrain

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		True	Excavation/Survey	13^{th} to 17^{th} Centuries?	(Pirazzoli-t'Serstevens 1985, Sasaki 1989)

Site 57: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	LQ	Over 50	Stoneware	13^{th} to 14^{th} Centuries	Over 100
Blue and White	JDZ	Over 20	Porcelain	14^{th} to 17^{th} Centuries	
White	Fujian?	Over 10	Stoneware	?	
Brown glazed	MTB?	Over 20	Stoneware	13^{th} to 17^{th} Centuries?	

Site 58: al-Huwailah, Qatar

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		False	Survey	17^{th} to 19^{th} Centuries	(Garlake 1978:174-179)

Site 58: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Blue and White	?	236	Porcelain	18^{th} Century	330
Brown-glazed Blue and White	JDZ	34	Porcelain	Kangxi period	
Enameled	?	25	Porcelain		
Polychrome?	?	35	Porcelain	18^{th} to 19^{th} Centuries?	

Site 59: Yusufiyah, Qatar					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		False	Survey	13th to 19th Centuries	(de Cardi 1978:189)

Site 59: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Blue and White?	?	Small?	Porcelain	18th Century?	Small?

Site 60: al-Furaihah (II), Qatar					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		False	Survey	14th to 18th Centuries	(de Cardi 1978:187)

Site 60: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Blue and White?	?	?	Porcelain	18th Century?	?

Site 61: al-Zubarah, Qatar					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		False	Survey	17th to 18th Centuries	(de Cardi 1978:186)

Site 61: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Blue and White?	?	?	Porcelain	18th Century?	?

Site 62: al-Na’man, Qatar					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		False	Survey	9th to 10th Centuries	(de Cardi 1978:4, 186)

Site 62: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon?	YUE?	?	Stoneware	9th to 10th Centuries	?

?	?	?	Stoneware	9th to 10th Centuries	

Site 63: Bir Zekrit, Qatar

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		False	Survey	17th to 18th Centuries	(de Cardi 1978:199)

Site 63: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
?	?	2	Porcelain	17th to 18th Centuries?	2

Site 64: Ras Uwainat Ali Dis, Qatar

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		False	Survey	17th to 18th Centuries	(de Cardi 1978:198)

Site 64: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
?	?	2	Porcelain	17th to 18th Centuries?	2

Site 65: Kush, UAE

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site	Ras al-Khaimah	True	Excavation	5th to 17th Centuries	(Kennet 2004:60-70); Author's examination

Site 65: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	YUE	3	Stoneware	12th Century?	
Celadon	LQ	12	Stoneware	13th to 16th Centuries	
Celadon	Guangdong/Fujian?	9	Stoneware	Early 12th/13th to 14th Centuries	63
White	DH	11	Stoneware	13th to 14th Centuries	
White	South China?	9	Stoneware	Early 12th to 14th Centuries	

White	?	6	Stoneware	?	
Brown glazed	Dusun	6	Stoneware	About 12th Century	
Blue and White	JDZ	7	Porcelain	16th to 17th Centuries	

Site 66: Area 74, UAE					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site	Ras al-Khaimah	False	Survey	?	27-28

Site 66: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Blue and White	?	50	Porcelain	16th to 17th Centuries	
?	Southern China?	1	?	?	Over 60
Enamelled	?	7	?	?	

Site 67: Khatt, UAE					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site	Ras al-Khaimah	False			

Site 67: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Polychrome	CS	2	Stoneware	9th Century	2

Site 68: al-Mataf, UAE					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site	Ras al-Khaimah	True	Excavation/Survey	14th to 17th Centuries	(Kennet 2004:60-70, Hansman 1985)

Site 68: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Blue and White	JDZ	407	Porcelain	14th to 17th Centuries	About 500
Enamelled	JDZ	16	Porcelain	15th to 17th Centuries	

White	DH	2	Stoneware	Surface deposit?	
Brown glazed	MTB	64?	Stoneware	14-17th Centuries	

Site 69: Julfar, UAE

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		True	Excavation/Survey	13th to 17th Centuries	(Akemi 2008, Pirazzoli-t'Serstevens 2003, Sasaki and Sasaki 1992)

Site 69: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	LQ	About 600	Stoneware	14th to 15th Centuries	Huge (Over 2,000)
Celadon	Guangdong/Fujian?	About 400	Stoneware	14th to 15th Centuries	
Brown glazed	MTB?	8?	Stoneware	13th to 14th Centuries?	
Qingbai	DH/Fujian?	Many	Stoneware	13th to 14th Centuries	
White	JDZ		Porcelain	15th to 16th Centuries	
Blue and White	JDZ	Some	Porcelain	15th Century	
Blue and White	JDZ	About 700	Porcelain	16th to 17th Centuries	

Site 70: Hulaylah, UAE

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site	Ras al-Khaimah	True	Survey	14th to 17th Centuries	(Kennet 2004:60-70, 1994)

Site 70: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Brown glazed	Dusun	1	Stoneware	About 12th Century	75
Dark brown glazed	MTB	14	Stoneware	14th-17th Centuries	
Celadon	LQ	15	Stoneware	13th to 15th Centuries	
Blue and White	JDZ	40	Porcelain	15th to 17th Centuries	
White	?	5	Stoneware	15th to 17th Centuries	

Site 71: Did Diddah, Oman					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site	Khasab	False	Survey	?	(de Cardi et al. 1975:39)

Site 71: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Blue and White	?	?	Porcelain	15th to 17th Centuries	?
Celadon	?	?	Stoneware	14th to 15th Centuries	

Site 72: Mukhi, Oman					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		False	Survey	?	(de Cardi et al. 1975:40-41)

Site 72: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	LQ	1?	Stoneware	14th Century and later	1?

Site 73: al-Balid, Oman					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		False	Excavation	6th to 18th Centuries	(Zarins 2007)

Site 73: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Blue and White	?	?	Porcelain?	13th to 15th Centuries	
Celadon	?	?	Stoneware	13th to 15th Centuries	?
Enameled	?	Some pieces?	Porcelain	16th Century and later	

Site 74: Bukha, Oman					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Remains Site		False	Survey	?	(de Cardi et al. 1975:42)

Site 74: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Blue and White	?	?	Porcelain	16th to 17th Centuries?	?

Site 75: Sayl al Asfal, Oman					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		False	Survey	?	(de Cardi et al. 1975:49)

Site 75: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	LQ?	1?	Stoneware	13th Century	?
Brown glazed	MTB	?	Stoneware	13th to 15th Centuries	

Site 76: Ra's Sheikh Mas'ud, Oman					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		False	Survey		(de Cardi et al. 1975:41)

Site 76: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	?	?	Stoneware	16th to 17th Centuries	?

Site 77: Ghubbat Dabshun, Oman					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		False	Survey	?	(de Cardi et al. 1975:37)

Site 77: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	?	?	Stoneware	12th to 13th Centuries	?
Marco Polo (Qingbai)	DH	?	Stoneware	12th to 13th Centuries	

Site 78: Wadi Shariyah, Oman

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		False	Survey	?	(de Cardi et al. 1975:45)

Site 78: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Blue and White	?	?	Porcelain	17th Century	?

Site 79: Sohar, Oman

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		True	Excavation	All period	(Pirazzoli-t'Serstevens 1988, 1985)

Site 79: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	YUE		Stoneware	9th to 10th Centuries	
Polychrome	CS		Stoneware	9th Century	
Polychrome	Guangdong?		Stoneware	11th to 12th Centuries	
Qingbai	JDZ?	About 170	Stoneware	9th to 10th Centuries	
White	XING		Stoneware	9th Century	
White	DING		Stoneware	9th to 10th Centuries	649
White	Northern China		Stoneware	10th Century?	
Brown glazed?	Dusun?	About 100	Stoneware	9th to 10th Century?	
Celadon	LQ	About 20	Stoneware	14th Century	
Blue and White	JDZ		Porcelain	16th Century	
Blue and White	JDZ/Fujian?	About 350	Porcelain	18th to 20th Centuries	

Site 80: Rustaq, Oman

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Inland Site?		False	Survey	unknown	Author's data

Site 80: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Blue and White	JDZ	14	Porcelain	17^{th} century and later	18
Blue and White	DH	2	Porcelain	17^{th} century and later	
Enamelled	JDZ	1	Porcelain	15^{th} to 16^{th} Centuries	
White	JDZ	1	Porcelain	15^{th} to 16^{th} Centuries	

Site 81: Wadi Maqaqah, Oman					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		False	Survey	?	(de Cardi et al. 1975:46)

Site 81: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	?	?	?	?	?
Brown glazed?	MTB?	?	?	?	

Site 82: Aqaba, Jordan					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Remains Site		False	Excavation	About 10^{th} to 12^{th} Centuries	

Site 82: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	YUE	?	Stoneware	10^{th} Century	Many?
Green-blue glazed	Dusun/MTB?	?	Stoneware	10^{th} Century	
Qingbai	JDZ	common	Stoneware	10^{th} to 11^{th} Centuries	
White	DING	?	Stoneware?	10^{th} Century?	

Site 83: Athar, Saudi Arab					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference

Coastal Site			Excavation	Pre-history to	(Zarins and Zahrani 1985:79-80)

Site 83: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
No glaze	Dusun?	Common (many?)	Stoneware	8^{th} to 9^{th} Centuries?	
White	GY?	White	Porcelain?	8^{th} to 9^{th} Centuries?	
White	DING?	Porcelain as a	Porcelain?	11^{th} to 14^{th} Centuries?	Many?
White	XING?	large	Porcelain?	8^{th} to 9^{th} Centuries?	
White (Qingbai?)	JDZ?	percentage (?)	Porcelain?	11^{th} to 14^{th} Centuries?	
Celadon	YUE?	?	Stoneware	8^{th} to 9^{th} Centuries?	
Celadon	LQ?	3	Porcelain?	11^{th} to 14^{th} Centuries?	

Site 84: al-Sharjah, Saudi Arab

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		False	Survey	Historical Text (7^{th} to 15^{th} Centuries)	(Zarins and Zahrani 1985:86-87, 90, Rougeulle 1996:168)

Site 84: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
White?	DING/JDZ?	Sizeable	Porcelain?	11^{th} to 12^{th} Century?	?
Celadon	LQ?	Sizeable	Stoneware	11^{th} to 15^{th} Century?	

Site 85: Sirrin, Saudi Arab

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		False	Survey	10^{th} to 14^{th} Century?	(Zarins and Zahrani 1985:87, 90, Rougeulle 1996:168)

Site 85: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity

White?	DING/JDZ?	Sizeable	Porcelain?	11^{th} to 12^{th} Century?	?
Celadon	LQ?	Sizeable	Stoneware	11^{th} to 15^{th} Century?	

Site 86: al-Mabiyat, Saudi Arab

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		False	Survey	9^{th} to 14^{th} Centuries?	(Zarins and Zahrani 1985:90, Rougeulle 1996:161, 168)

Site 86: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
White?	DING/JDZ?	Sizeable	Porcelain?	9^{th} to 12^{th} Century?	?
Celadon	LQ?	Sizeable	Stoneware	9^{th} to 14^{th} Century?	

Site 87: Najran, Saudi Arab

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		False	Survey	13^{th} to 14^{th} Centuries?	(Zarins and Zahrani 1985:90)

Site 87: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
White?	DING/JDZ?	Sizeable	Porcelain?	14^{th} Century?	?
Celadon	LQ?	Sizeable	Stoneware	14^{th} Century?	

Site 88: Bar Antar, Saudi Arab

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		False	Survey	11^{th} to 14^{th} Centuries?	(Zarins and Zahrani 1985:90, Rougeulle 1996:172)

Site 88: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
White?	DING/JDZ?	Sizeable	Porcelain?	14^{th} Century?	?

Celadon	LQ?	Sizeable	Stoneware	14th Century??

Site 89: al-Jar, Saudi Arab					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		False	Survey	4th to 12th Century?	(Zarins and Zahrani 1985:88, 90, Rougeulle 1996:168, Whalen et al. 1981)

Site 89: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
White?	DING/JDZ?	Sizeable	Stoneware?	14th Century?	?
Celadon	LQ?	Sizeable	Stoneware	14th Century?	

Site 90: Aynunah, Saudi Arab					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		False	Survey	8th to 12th Centuries?	(Zarins and Zahrani 1985:90, Rougeulle 1996:168, Ingraham et al. 1981)

Site 90: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
White?	DING/JDZ?	Sizeable	Stoneware?	9th to 12th Century?	?
Celadon	LQ?	Sizeable	Stoneware	9th to 12th Century?	

Site 91: Abyan, Yemen					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		False	Survey	About 7th to 14th Centuries	(Hardy-Guilbert and Rougeulle 1997:129, Lane and Serjeant 1948)

Site 91: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Brown glazed	Dusun	Some?	Stoneware	8th to 9th Centuries	
?	?	Some?	Porcelain?	?	Some?
Celadon	YUE	Some?	Stoneware	8th to 9th Centuries	
Celadon	LQ	Scarce?	Stoneware	12th to 13th Centuries?	

Site 92: Ahwar, Yemen

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		False	Survey	14th to 18th Centuries?	(Hardy-Guilbert and Rougeulle 1997:135)

Site 92: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Blue and White	?	Few	Porcelain	18th to 19th Centuries	Few?

Site 93: al-Shihr, Yemen

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		False	Survey	7th to 15th Centuries?	(Hardy-Guilbert and Rougeulle 1997:138, Hardy-Guilbert 2005:75)

Site 93: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Polychrome	CS	?	Stoneware	8th to 9th Centuries	
Celadon	LQ	?	?	13th to 14th Centuries	?
Blue and White	?	?	Porcelain	15th to 19th Centuries	

Site 94: Sharmah, Yemen

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		True	Excavation	10th to 14th Centuries	(Zhao 2006, Rougeulle 2003)

Site 94: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	YUE	Less than 10?	Stoneware	9th to 11th Centuries	Over 1,500
Celadon	LQ	About 300	Stoneware	13th to 14th Centuries	
Celadon	YZ		Stoneware	11th to 12th Centuries	
Celadon	Fujian/Guangdong?		Stoneware	11th to 12th Centuries	
Qingbai	JDZ	About 800	Stoneware	11th to 14th Centuries	
Qingbai	Guangdong?		Stoneware	11th to 14th Centuries	
Qingbai	Fujian?		Stoneware	11th to 14th Centuries	
Qingbai	Anhui?		Stoneware	11th to 14th Centuries	
White	Fujian?	About 100	Stoneware	11th Century?	
Polychrome	CS	1	Stoneware	9th to 11th Centuries	
Polychrome	Guangdong?	About 40	Stoneware	?	
Black glazed	JIAN/Guangdong?	About 40	Stoneware	11th to 13th Centuries	
Brown glazed	Dusun/MTB	About 250	Stoneware	9th to 14th Centuries	

Site 95: al-Qisha, Yemen					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		False	Excavation	10th ?-present	(Newton 2007)

Site 95: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
?	?	3	Porcelain	11th Centuries?	?
Blue and White	?	?	Porcelain	15th to 17th Centuries?	

Site 96: al-Qaraw, Yemen					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference

Coastal Site	False	Survey?	?	(Whitcomb 1988:202)

Site: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	YUE	?	Stoneware	13^{th} to 14^{th} Centuries (bad dating?)	?
Celadon	LQ	?	Stoneware	13^{th} to 14^{th} Centuries	
Brown glazed	MTB?	?	Stoneware	13^{th} to 14^{th} Centuries	
Qingbai	?	?	Stoneware	13^{th} to 14^{th} Centuries	
White	?	?	Porcelain	13^{th} to 14^{th} Centuries	
Blue and White	?	?	Porcelain	13^{th} to 14^{th} Centuries	

Site 97: Kish Island, Iran, the Williamson Collection

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site	Area AE	True	Survey/Excavation	9th to 17th Centuries	(Priestman 2005, Mori 2008)

Site 97: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	Guangdong	12	Stoneware	14^{th} century	
Celadon	Guangdong	1	Stoneware	14^{th} to 15^{th} centuries	
Celadon	LQ	99	Stoneware	13^{th} to 14^{th} centuries	
Celadon	LQ	90	Stoneware	14^{th} to 15^{th} centuries	
Polychrome	CIZHOU	1	Stoneware	14^{th} century	
Brown glazed	Dusun	4	Stoneware	8^{th} to 9^{th} centuries	`
Brown glazed	MTB	35	Stoneware	14^{th} to 17^{th} centuries	
Brown glazed	?	49	Stoneware	?	
Qingbai	DH	11	Stoneware	12^{th} to 13^{th} centuries	
Qingbai	JDZ	8	Stoneware	11^{th} to 13^{th} centuries	
Qingbai	JDZ	1	Stoneware	14^{th} century	

White	?	1	Stoneware	?
White	Southern China	1	Porcelain	16th to 17th centuries
White	Guangdong	3	Stoneware	11th century
White	Southern China	3	Stoneware	12th to 13th centuries
White	Southern China	1	Stoneware	10th to 12th centuries
?	?	1	?	?
White	Fujian	17	Stoneware	14th Century
Celadon	Fujian	21	Stoneware	14th Century

Site 98: Habil, Yemen

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		False	Survey	?	(Lane and Serjeant 1948)

Site 98: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	LQ	Small?	Stoneware	13th to14th Centuries	
Celadon	?	?	Stoneware	?	
Qingbai	?	?	Stoneware	9th to 11th Centuries?	?
Blue and White	JDZ	?	Porcelain	14th Century	
Blue and White	JDZ?	?	Porcelain	15th to 17th Centuries	

Site 99: Kawd am-Saila, Yemen

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		False	Survey	?	(Lane and Serjeant 1948)

Site 99: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	LQ	Many	Stoneware	13th to14th Centuries	Many
Brown glazed	MTB?	Many	Stoneware	14th Centuries	

White (Shufu?)	JDZ?	1	Stoneware	?	
White	DING	Many	Stoneware	12th to 13th Centuries (bad dating?)	
Qingbai	DH?	1	Stoneware	12th to 14th Centuries?	
Qingbai	?	?	Stoneware	9th to 11th Centuries?	
Blue and White	JDZ	?	Porcelain	14th Century	
Blue and White	JDZ?	?	Porcelain	15th to 17th Centuries	

Site 100: Zabid, Yemen

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site	Tihamah	False	Survey	About 15th Century and later	(Keall 1983:57)

Site 100: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Blue and White	?	?	Porcelain	15th to 19th Centuries	?

Site 101: Fustat, Egypt

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		True	Excavation/Survey	7th to 19th Centuries	(Yuba 2014, Ma and Meng 1987)

Site 101: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Green splahsed	GY	10?	Stoneware	8th to 9th Centuries	Huge (About 12,000)
White	XING	10?	Stoneware	8th to 9th Centuries	
White	JDZ	?	Stoneware	11th to 12th Centuries	
White	DING	?	Stoneware	11th to 12th Centuries	
White	SC	?	Stoneware	11th to 12th Centuries	
Polychrome	CS	8	Stoneware	8th to 9th Centuries	
Enamelled	JDZ	36	Porcelain	16th Century	
Cizhou	CZ	6	Stoneware	11th to 12th Centuries	

Celadon	YUE	10?	Stoneware	8th to 9th Centuries	
Celadon	YZ	25	Stoneware	11th to 12th Centuries	
Celadon	YUE	941	Stoneware	11th to 12th Centuries	
Celadon	LQ	2394	Stoneware	13th to 14th Centuries	
Blue and White	JDZ	298	Porcelain	14th Century	
Blue and White	JDZ	60	Porcelain	15th Century	
Blue and White	JDZ	800?	Porcelain	16th Century	
Blue and White	JDZ	350	Porcelain	17th Century	
Blue and White	JDZ	about 5000?	Porcelain	17th to 20th Centuries	

Site 102: Quseir, Egypt

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		False	Excavation	13th to 14th Centuries	(Whitcomb 1983, Mikami 1988)

Site 102: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Qingbai	DH	3	Stoneware	14th Century	
Blue and White	JDZ	3	Porcelain	14th Century	
Celadon	YUE	2	Stoneware	11th to 12th Centuries	15?
Celadon	LQ	7?	Stoneware	13th to 14th Centuries	
Polychrome	CZ	?	Stoneware	14th Century?	

Site 103: Suakin, Sudan

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Costal		False	Excavation	unknown	Author’s Data

Site 103: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Brown glazed	MTB?	2	Stoneware	?	12

Blue and White	JDZ	5	Porcelain	16^{th} to 17^{th} Centuries	
Blue and White	Fujian?	3	Porcelain	16^{th} to 19^{th} Centuries	
White	?	1	Stoneware	?	
Enamelled	JDZ	1	Porcelain	16^{th} Century	

Site 104: Manekweni, Mozambique

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		False	Excavation	12^{th} to 17^{th} Centuries	(Garlake 1976:42)

Site 104: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Blue and White	JDZ?	Small	Porcelain	17^{th} Centuries	Small

Site 105: Mnarani, Kenya

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site	Kilifi	Partly True	Excavation	13^{th} to 15^{th} Centuries	(Kirkman 1959)

Site 105: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	LQ?	?	Stoneware	15^{th} Century?	About 50?
Brown glazed	?	?	Stoneware	15^{th} Century?	
White (Qingbai)?	Fujian?	?	Stoneware	15^{th} Century?	
Blue and White	?	?	Porcelain	16^{th} Century?	

Site 106: Kinuni, Kenya

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		Partly True	Excavation	14^{th} Century and later	(Kirkman 1957:149)

Site 106: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity

Brown glazed	MTB?	1?	Stoneware	?	Small
Blue and White	JDZ/Fujian?	Small (5?)	Porcelain	16th Century (Wanli Reign)?	

Site 107: Kilepwa, Kenya

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		True	Excavation	12th to 16th Centuries	(Kirkman 1952:171)

Site 107: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	?	?	Stoneware	13th to 14th Centuries	
Lead-glazed	?	?	High fired pottery?	13th to 16th Centuries?	?
Blue and White	?	?	Porcelain	14th to 16th Centuries	

Site 108: Kilwa, Kenya

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Costal Site		True	Excavation	9th to 19th Centuries	(Chittick and Wheeler 1974:308-312, Ma and Meng 1987)

Site 108: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Blue and White	KN 60	18	Porcelain	13th to 14th Centuries	
Brown glazed	MTB?	?	Stoneware	?	
Celadon	KN 76	Small (28?)	Stoneware	13th to 15th Centuries	
Celadon	KN 76?	Small (6?)	Stoneware	13th to 15th Centuries	
Polychrome	KN 16	2	Stoneware	14th Century	100？
Celadon	KN 50	1	Stoneware	11th to 12th Centuries	
Blue and White	KN 60	50	Porcelain	16th Century	
Blue and White	KN 60	27	Porcelain	17th to 19th Century	
Qingbai	KN 60?	?	Stoneware	10th to 13th Centuries	

White	?	?	Stoneware	16th to 17th Centuries	
Qingbai	KN 105	?	Stoneware	13th to 14th Centuries	
Shufu	KN 60	1	Porcelain	14th Century	

Site 109: Mombasa, Kenya

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		False	Excavation	11th to 16th Centuries	(Sassoon 1980:30-31)

Site 109: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	LQ?	137	Stoneware	12th to 14th Centuries?	164
Qingbai	JDZ?	2	Stoneware?	15th Century?	
Brown glazed	MTB?	14	Stoneware	12th to 15th Centuries	
Blue and White	JDZ?	11	Porcelain	13th to 15th Centuries	

Site 110: Shanga (Tr 6-10), Kenya

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		False	Excavation	8th to 15th Centuries	(Horton et al. 1996:273, 303-310, Priestman 2013:290-295)

Site 110: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Polychrome	CS	14	Stoneware	Late 8th to Early 10th Centuries	346
Brown glazed	Dusun	9	Stoneware	Late 9th to Early 15th Centuries	
Brown glazed	MTB	69	Stoneware	Early 11th to Early 15th Centuries	
Celadon	YUE	7	Stoneware	Late 9th to Middle 10th Centuries	
Celadon	YUE	24	Stoneware	Early 11th to Middle 13th Centuries	
Celadon	LQ	5	Stoneware	Early 11th to early 12th Centuries	
Celadon	LQ	74	Stoneware	Late 13th to Late 14th Centuries	

Celadon	LQ	103	Stoneware	Late 14th to Early 15th Centuries
White	DING?	8	Porcelain?	Early 11th Century
Qingbai	JDZ	22	Stoneware	Early 11th to Middle 13th Centuries
Qingbai	JDZ	5	Stoneware	Late 13th to Late 14th Centuries
Qingbai	JDZ	2	Stoneware	Late 14th to Early 15th Centuries
Qingbai	DH	4	Stoneware	Late 12th to Late 14th Centuries

Site 111: Gedi, Kenya

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		True	Excavation	12th to 16th Centuries	(Liu et al. 2012, Kirkman 1954)

Site 111: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Polychrome	?	1	Stoneware	13th to 14th Centuries	
Polychrome	CZ	1	Stoneware	13th to 14th Centuries	
Qingbai	DH	2	Stoneware	13th to 14th Centuries	
Qingbai	JDZ	2	Stoneware	13th Century	
Red and White	JDZ	1	Porcelain	15th Century	
White	JDZ	6	Porcelain	15th to 16th Centuries	
Brown glazed	MTB?	2	Stoneware	13th to 14th Centuries	1,262
Celadon	FJ	30	Stoneware	13th to 14th Centuries	
Brown glazed	FJ	12	Stoneware	15th to 17th Centuries	
Blue and White	JDZ	20	Porcelain	14th Century	
Blue and White	JDZ	1	Porcelain	15th Century	
Celadon	LQ	4	Stoneware	16th Century	
Celadon	LQ	294	Stoneware	15th Century	
Blue and White	LQ	447	Porcelain	16th to 17th Centuries	

Celadon	LQ	439	Stoneware	13th to 14th Centuries	

Site 112: Manda, Kenya					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site	Lamu Archipelago	True	Excavation		(Chittick 1984:287-289, Horton 1986, Priestman 2013)

Site 112: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Olive-green glazed	Dusun	192	Stoneware	9th Century	515
Olive-green glazed	MTB	250	Stoneware	14th to 17th Centuries	
Polychrome	CS	1	Stoneware	9th Century	
Celadon	YUE	3	Stoneware	9th Century	
Celadon	YUE	1	Stoneware	9th to 11th Centuries	
Celadon	LQ	10	Stoneware	13th to 15th Century	
White	Northern China?	14	Stoneware	10th to 13th Centuries	
Qingbai	JDZ	1	Stoneware	13th to 14th Centuries?	
Blue and White	JDZ	43	Porcelain	16th to 17th Centuries	

Site 113: Unguja Ukuu, Tanzania					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site	Zanzibar	False	Survey/Excavation	9th to 16th Centuries	(Horton and Clark 1985:169-170)

Site 113: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Polychrome	CS	Small?	Stoneware	9th Century	?
Celadon	YUE	?	Stoneware	9th Century	
Olive-green glazed	Dusun	?	Stoneware	9th Century	

Site 114: Jongowe, Tanzania					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site	Zanzibar	False	Survey/Excavation	9th to 16th Centuries	(Horton and Clark 1985:169-170)

Site 114: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	?	?	Stoneware	12^{th} to 14^{th} Centuries	?
Qingbai	?	?	Stoneware	12^{th} to 14^{th} Centuries	

Site 115: Mkokotoni, Tanzania					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site	Zanzibar	False	Survey/Excavation	9^{th} to 16^{th} Centuries	(Horton and Clark 1985:169-170)

Site 115: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	?	?	Stoneware	12^{th} to 14^{th} Centuries	?
Qingbai	?	?	Stoneware	12^{th} to 14^{th} Centuries	

Site 116: Zanzibar town, Tanzania					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site	Zanzibar	False	Survey/Excavation	9th to 16th Centuries	(Horton and Clark 1985:169-170)

Site 116: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	?	?	Stoneware	12^{th} to 14^{th} Centuries	?
Qingbai	?	?	Stoneware	12^{th} to 14^{th} Centuries	

Site 117: Fukuchani, Tanzania					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site	Zanzibar	False	Survey/Excavation	9^{th} to 16^{th} Centuries	(Horton and Clark 1985:169-170)

Site 117: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	?	?	Stoneware	12^{th} to 14^{th} Centuries	?
Qingbai	?	?	Stoneware	12^{th} to 14^{th} Centuries	

Site 118: Kizimkazi, Tanzania					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site	Zanzibar	False	Survey/Excavation	9^{th} to 16^{th} Centuries	(Horton and Clark 1985:169-170)

Site 118: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	?	?	Stoneware	12^{th} to 14^{th} Centuries	?
Qingbai	?	?	Stoneware	12^{th} to 14^{th} Centuries	

Site 119: Ras Mkumbuu, Tanzania					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site	Pemba	False	Survey/Excavation	9^{th} to 14^{th} Centuries	(Horton and Clark 1985:169-170)

Site 119: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	LQ?	?	Stoneware	12^{th} to 14^{th} Centuries	?
Qingbai	?	?	Stoneware	12^{th} to 14^{th} Centuries	

Site 120: Mtambwe Mkuu, Tanzania					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site	Pemba	False	Survey/Excavation	9^{th} to 14^{th} Centuries	(Horton and Clark 1985:169-170)

Site 120: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	LQ?	?	Stoneware	12^{th} to 14^{th} Centuries	?

Qingbai	?	?	Stoneware	12th to 14th Centuries	

Site 121: Nkia wa Ngombe, Tanzania					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site	Pemba	False	Survey/Excavation	9th to 14th Centuries	(Horton and Clark 1985:169-170)

Site 121: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	LQ?	?	Stoneware	12th to 14th Centuries	?
Qingbai	?	?	Stoneware	12th to 14th Centuries	

Site 122: Mapungubwe Hill, Southern Africa					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Inland Site	Pemba	False	Survey/Excavation	9th to 14th Centuries	(Fouché et al. 1937, Prinsloo et al 2005)

Site 122: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	LQ?	4	Stoneware	13th to 14th Centuries	?

Site 123: South Iran Coast, Iran, the Williamson Collection					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Sites	Areas A, B, D, F & J	True	Survey/Excavation	9th to 20th Centuries	(Priestman 2005)

Site 123: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Blue and White	JDZ	174	Porcelain	16th Century	464
Blue and White	JDZ	66	Porcelain	17th to 20th centuries	
Blue and White	Southern China	44	Porcelain	17th to 20th centuries	

Polychrome	CS	8	Stoneware	9^{th} to 10^{th} Centuries
Qingbai	JDZ	14	Stoneware	11^{th} to 13^{th} Centuries
Qingbai	JDZ	1	Stoneware	14^{th} century
Qingbai (CREAM)	Southern China	1	Pottery	15^{th} to 17^{th} Centuries
Qingbai	DH	7	Stoneware	12^{th} to 13^{th} Centuries
Qingbai	DH	1	Stoneware	18^{th} century
Celadon	Guangdong	2	Stoneware	11^{th} to 12^{th} Centuries
Celadon	Guangdong	7	Stoneware	14^{th} century
Celadon	LQ	21	Stoneware	13^{th} to 14^{th} Centuries
Celadon	LQ	39	Stoneware	14^{th} to 15^{th} Centuries
White	?	1	Stoneware	?
White	Southern China	1	Stoneware	18^{th} century
White	Guangdong	2	Stoneware	11^{th} century
White	Guangdong	2	Stoneware	11^{th} to 13^{th} Centuries
White	JDZ	1	Stoneware	16^{th} century
White	Southern China	10	Stoneware	10^{th} to 11^{th} Centuries
White	Southern China	10	Stoneware	10^{th} to 12^{th} Centuries
White	Northern China?	2	Stoneware	9^{th} to 10^{th} Centuries
Brown glazed	Dusun	7	Stoneware	8^{th} to 9^{th} Centuries
Brown glazed	?	20	Stoneware	?
Green Splashed	GY	5	Stoneware	9^{th} to 10^{th} Centuries
Celadon	YUE	4	Stoneware	8^{th} to 10^{th} centuries
White	XING	4	Stoneware	8^{th} to 10^{th} centuries
White	GY	4	Stoneware	8^{th} to 10^{th} centuries
Celadon	Guangdong	4	Stoneware	8^{th} to 10^{th} centuries

?	?	2	Stoneware	?	
Site 124: Jask, Iran					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site	Jask	True	Survey		(Priestman 2005)
Site 124: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Blue and White	JDZ	2	Porcelain	15^{th} to 16^{th} Centuries	2
Site 125: Sofala, Mozambique					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		False	Excavations	16^{th} Century	(Dickinson 1975)
Site 125: Unearthed Chinese Ceramics					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	?	8	Stoneware	15^{th} to 16^{th} Centuries	
Blue and White	JDZ	68	Porcelain	16^{th} to 18^{th} Centuries	83
?	?	7	Stoneware	15^{th} to 18^{th} Centuries	
Site 126: al-Nudud Port Site, UAE					
Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Port Site	Ras al-Khaimah	Yes	Excavations	14^{th} to 20^{th} Century	(Zhao et al. 2014:35-42)
Site 126: Unearthed Chinese Ceramic20					
Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	LQ	5	Stoneware	13^{th} to 14^{th} Centuries	
Celadon	LQ	94	Stoneware	14^{th} to 16^{th} Centuries	275
Celadon	FJ/GD/JDZ	10	Stoneware	12^{th} to 15^{th} Centuries	
Blue and White	JDZ	12	Porcelain	14^{th} to 15^{th} Centuries	

Blue and White	JDZ?	75	Porcelain	Late 15th to early 16th Centuries
Blue and White	JDZ?	13	Porcelain	16th Century
Blue and White	JDZ?	5	Porcelain	?
Black Glazed	GD (the Shiwan Kilns)	2	Stoneware	16th Century
Black Glazed	MTB (China/SE Asia)	46 (2+5+39)	Stoneware	16th Century
Qingbai	Southern China	4	Stoneware	13th to 14th Centuries
White (CREAM)	FJ	3	Stoneware	14th Century
White	JDZ	5	Porcelain	16th Century
Enamelled	JDZ	1	Porcelain	16th Century

Site 127: Aydhab, Egypt/Sudan

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		Yes	Surface Survey	11th to 14th Centuries	(Mikami 1988:13-16)

Site 125: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
Celadon	YUE	695	Stoneware	11th Century	999
Celadon	LQ		Porcelain	14th Century	
White	JDZ	93	Stoneware	11th to 13th Centuries	
White	FJ		Stoneware	11th to 13th Centuries	
Blue and White	JDZ	40	Porcelain	14th Century	
Black Glazed	MTB (China/SE Asia)	171	Stoneware	13th to 14th Centuries	

Site 128: Qal'at al-Bahrain, Bahrain

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		Yes	Excavation	Pre-history to 17th Century	(Kervran et al. 2005:303-308)

Site 128: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity

Celadon	LQ	35	Stoneware	12^{th} to 14^{th} Centuries	
Celadon	LQ	15	Stoneware	15^{th} to 16^{th} Centuries	
Blue and White	JDZ	20	Porcelain	16^{th} Century	
White	South China	7	Stoneware	13^{th} to 14^{th} Centuries	100
White	DING?	1	Stoneware	13^{th} to 14^{th} Centuries	
Green and Brown Glazed	?	22	Stoneware	?	

Site 129: Bilad al-Qadim, Bahrain

Site Type	Location	Published Photos	Excavation/Survey	Site Dating	Reference
Coastal Site		Yes	Excavation	Pre-history to 17^{th} Century	(Carter 2005:423-424, Insoll 2005 Priestman 2013:257)

Site 128: Unearthed Chinese Ceramics

Class	Kiln Site	Quantity	Quality	Ceramic Dating	Total Quantity
White	North China?	2	Stoneware	8^{th} to 10^{th} Centuries	
White	North China?	2	Stoneware	11^{th} to 13^{th} Centuries	
White	South China?	4	Stoneware	13^{th} to 14^{th} Centuries	
Celadon	YUE	3	Stoneware	10^{th} to 11^{th} Centuries	
Celadon	LQ	1	Stoneware	11^{th} to 12^{th} Centuries	46
Celadon	LQ	4	Stoneware	13^{th} to 14^{th} Centuries	
Blue and White	JDZ	18	Porcelain	13^{th} to 14^{th} Centuries	
Brown glazed	Dusun?	1	Stoneware	13^{th} to 14^{th} Centuries	
?	?	11	Stoneware?	10^{th} to 14^{th} Centuries	

Appendix 4: Summary Statistics for counting of Chinese ceramic classes produced from different Chinese kiln sites

Table 6.1: Summary Statistics for counting of Chinese ceramic classes produced from different Chinese kiln sites dated to the 6th to 7th centuries.

This table presents summary statistics for the full collected datasets of Chinese ceramic kiln sites dated from the 6th to 7th centuries. This table shows 27 different Chinese ceramic kiln sites listed in Appendix 1. The counting of class numbers of this summary statistics is based on Appendix 2. In total, these 27 kiln sites produce 49 groups of ceramic assemblages, which can be divided into six classes. '✓' refers the kiln site has produced the correspond class of ceramics; '-' refers to the kiln site has not. These six classes have been showed on the top of this table, with other information included 'Kiln Sites Number', 'Province', and 'Kiln Name'. The 'Kiln Number' refers to their numbers of these ceramic kiln sites, which can be found in Appendixes 1 and 2. The 'Province' means the Chinese provincial locations of these sites. The 'Kiln Name' tells their English and Chinese names. Ceramic classes in this table include ***G (green glazed wares, or celadon), Y (yellow glazed wares), B (black glazed wares), W (white glazed wares), J (Jun-type celadon wares) and P (polychrome wares).*** *These classes are based on Appendix 2 and their definitions can be found in Chapter II. On the bottom, N_1 refers to the total number of each class that produced from these 27 kiln sites. P_1 means the percentage of N_1, among 49 assemblages. On the right, N_2 refers to the total number of classes produced from each kiln site.*

Kiln Site Number	Province	Kiln Name		G	Y	B	W	J	P	N_2
Kiln 1	Anhui	Shouzhou	寿州窑	✓	✓	-	-	-	-	2
Kiln 2	Fujian	Cizao	磁灶窑	✓	-	-	-	-	-	1
Kiln 3	Fujian	Huai'an	怀安窑	✓	-	-	-	-	-	1
Kiln 4	Guangxi	Guilin	桂林窑	✓	✓	-	-	-	-	2
Kiln 5	Hunan	Yuezhou	岳州窑	✓	✓	-	-	-	-	2
Kiln 6	Jiangsu	Yixing	宜兴窑	✓	-	-	-	-	-	1
Kiln 7	Jiangxi	Zhangshu	樟树窑	✓	✓	-	-	-	-	2
Kiln 8	Jiangxi	Hongzhou	洪州窑	✓	✓	-	-	-	-	2
Kiln 9	Jiangxi	Yanshan	铅山窑	✓	-	-	✓	-	-	2
Kiln 11	Sichuan	Qingyangong	青羊宫窑	✓	✓	-	-	-	-	2
Kiln 12	Zhejiang	Deqing	德清窑	✓	-	✓	-	-	-	2
Kiln 13	Zhejiang	Yue	越窑	✓	-	-	-	-	-	1
Kiln 14	Zhejiang	Wuzhou	婺州窑	✓	-	-	-	-	-	1
Kiln 15	Zhejiang	Ou	瓯窑	✓	-	-	-	-	-	1
Kiln 16	Hebei	Cizhou	磁州窑	✓	-	-	-	-	-	1
Kiln 17	Hebei	Xing	邢窑	-	✓	✓	✓	-	-	3
Kiln 18	Henan	Gongyi	巩义窑	✓	-	-	✓	-	-	2
Kiln 19	Henan	Xingyang	荥阳窑	✓	✓	✓	✓	-	-	4
Kiln 20	Henan	Anyang	安阳窑	✓	✓	-	-	-	-	2
Kiln 21	Shandong	Qufu	曲阜窑	✓	✓	-	-	-	-	2
Kiln 22	Shandong	Zhongchenhao	中陈郝窑	✓	-	-	-	-	-	1
Kiln 23	Shandong	Zibo	淄博窑	✓	-	✓	-	-	-	2
Kiln 29	Hubei	E'zhou	鄂州窑	✓	-	-	-	-	-	1
Kiln 120	Henan	Pacun	扒村	✓	-	-	-	-	-	1
Kiln 134	Zhejiang	Longyou	龙游窑	-	-	-	-	✓	-	1
Kiln 135	Zhejiang	Xiangshan	象山窑	✓	-	-	-	✓	✓	3
Kiln 107	Henan	Luoyang	洛阳窑	✓	✓	✓	✓	-	-	4
N_1:				25	11	5	5	2	1	**Total: 49**
P_1:				51.0%	22.4%	10.2%	10.2%	4.1%	2.0%	**100.0%**

Table 6.2: Summary Statistics for counting of Chinese ceramic classes produced from different Chinese kiln sites dated to the 8th to 10th centuries.

This table presents summary statistics for the full collected datasets of Chinese ceramic kiln sites dated from the 8th to 10th centuries. This table shows the 53 different Chinese ceramic kiln sites listed in Appendix 1. The counting of class numbers of this summary statistics is based on Appendix 2. In total, these 53 kiln sites produce 123 groups of ceramic assemblages, which can be divided into eight classes. '✓' refers the kiln site has produced the correspond class of ceramics; '-' refers to the kiln site has not. These eight classes have been showed on the top of this table, with other information included 'Kiln Sites Number', 'Province', and 'Kiln Name'. The 'Kiln Number' refers to their numbers of these ceramic kiln sites, which can be found in Appendixes 1 and 2. The 'Province' means the Chinese provincial locations of these sites. The 'Kiln Name' tells their English and Chinese names. Ceramic classes in this table include ***G (green glazed wares, or celadon), Y (yellow glazed wares), B (black glazed wares), W (white glazed wares), S (Sancai-type wares), P (polychrome wares), C (blue and white ceramics) and O (other classes, such as marbled-earthenware wares).*** *These classes are based on Appendix 2 and their definitions can be found in Chapter 2: 2.5.2-(1). At the bottom, N_1 refers to the total number of each class that produced from these 53 kiln sites. P_1 means the percentage of N_1, among 123 assemblages. On the right, N_2 refers to the total number of classes produced from each kiln site.*

Kiln Site Number	Province	Kiln Name		G	Y	B	W	S	P	C	O	N_2
Kiln 1	Anhui	Shouzhou	寿州窑	✓	✓	✓	-	-	-	-	-	3
Kiln 2	Fujian	Cizao	磁灶窑	✓	✓	-	-	-	-	-	-	2
Kiln 3	Fujian	Huai'an	怀安窑	✓	-	-	-	-	✓	-	-	2
Kiln 4	Guangxi	Guilin	桂林窑	✓	✓	-	-	-	-	-	-	2
Kiln 5	Hunan	Yuezhou	岳州窑	✓	✓	-	-	-	-	-	-	2
Kiln 6	Jiangsu	Yixing	宜兴窑	✓	-	-	-	-	-	-	-	1
Kiln 8	Jiangxi	Hongzhou	洪州窑	✓	✓	-	-	-	-	-	-	2
Kiln 9	Jiangxi	Yanshan	铅山窑	✓	-	-	-	-	-	-	-	1
Kiln 10	Sichuan	Qionglai	邛崃窑	✓	✓	-	-	-	-	-	-	2
Kiln 11	Sichuan	Qingyanggong	青羊宫窑	✓	✓	-	-	-	-	-	-	2
Kiln 13	Zhejiang	Yue	越窑	✓	-	-	-	-	-	-	-	1
Kiln 14	Zhejiang	Wuzhou	婺州窑	✓	-	-	-	-	-	-	-	1
Kiln 15	Zhejiang	Ou	瓯窑	✓	-	-	-	-	-	-	-	1
Kiln 17	Hebei	Xing	邢窑	✓	✓	-	✓	✓	-	-	-	4
Kiln 18	Henan	Gongyi	巩义窑	-	-	✓	✓	✓	-	✓	✓	5
Kiln 19	Henan	Xingyang	荥阳窑	✓	✓	✓	✓	-	-	-	-	4
Kiln 20	Henan	Anyang	安阳窑	-	-	✓	-	-	-	-	-	1
Kiln 21	Shandong	Qufu	曲阜窑	✓	✓	✓	✓	-	-	-	-	4
Kiln 22	Shandong	Zhongchenhao	中陈郝窑	✓	-	-	-	-	-	-	-	1
Kiln 23	Shandong	Zibo	淄博窑	✓	-	✓	-	-	-	-	-	2
Kiln 24	Anhui	Yanqian	岩前窑	✓	-	-	-	-	-	-	-	1
Kiln 25	Anhui	Songkou	竦口窑	✓	-	-	-	-	-	-	-	1
Kiln 26	Anhui	Kongling	孔灵窑	✓	✓	-	-	-	-	-	-	2
Kiln 27	Anhui	Qinxi	琴溪窑	✓	-	-	-	-	-	-	-	1
Kiln 28	Fujian	Jianyang	建阳窑	✓	-	✓	-	-	-	-	-	2
Kiln 29	Hubei	E'zhou	鄂州窑	✓	✓	-	-	-	-	-	-	2
Kiln 30	Fujian	Guangze	光泽窑	-	✓	-	-	-	-	-	-	1
Kiln 31	Fujian	Jiangle	将乐窑	✓	✓	-	-	-	-	-	-	2
Kiln 32	Guangdong	Chaozhou	潮州窑	✓	✓	-	-	-	-	-	-	2
Kiln 34	Guangdong	Gaoming	高明窑	✓	✓	-	-	-	-	-	-	2
Kiln 35	Guangdong	Meixian	梅县窑	✓	-	-	-	-	-	-	-	1
Kiln 36	Guangdong	Shiwan	佛山石湾窑	✓	✓	-	-	-	-	-	-	2
Kiln 37	Guangdong	Guanchong	官冲窑	✓	✓	-	-	-	-	-	-	2
Kiln 38	Hunan	Changsha	长沙窑	✓	✓	-	-	-	✓	-	-	3
Kiln 39	Jiangxi	Ganzhou	赣州窑	✓	✓	-	✓	-	✓	-	-	4
Kiln 40	Hebei	Ding	定窑	✓	✓	✓	✓	-	-	-	-	4
Kiln 41	Hebei	JinGuangxiing	井陉窑	-	✓	✓	✓	-	-	-	-	3
Kiln 42	Henan	Huixian	辉县窑	-	✓	✓	✓	✓	-	-	-	4
Kiln 43	Henan	Lushan	鲁山窑	-	-	✓	-	✓	-	-	-	2
Kiln 44	Henan	Mixian	密县窑	✓	✓	✓	✓	-	-	-	-	4

Kiln Site Number	Province	Kiln Name		G	Y	B	W	S	P	C	O	N_2
Kiln 45	Henan	Dengfeng	登封窑	-	✓	✓	✓	-	-	-	-	3
Kiln 46	Henan	Hebi	鹤壁集窑	-	✓	✓	✓	-	-	-	-	3
Kiln 47	Henan	Yuzhou	禹州窑	✓	✓	✓	-	-	-	-	-	3
Kiln 48	Henan	Neixiang/Deng	内乡窑/邓窑	✓	-	✓	✓	-	-	-	-	3
Kiln 49	Henan	Jiaxian	郏县窑	-	✓	✓	✓	✓	-	-	-	4
Kiln 50	Shaanxi	Yaozhou	耀州窑	✓	✓	✓	✓	-	-	-	-	4
Kiln 51	Shanxi	Hunanyuan	浑源窑	-	✓	✓	✓	-	-	-	-	3
Kiln 52	Shanxi	Pingding	平定窑	-	-	✓	✓	-	-	-	-	2
Kiln 57	Hunan	Hengyang	衡阳窑	✓	-	-	-	-	-	-	-	1
Kiln 59	Jiangxi	Jizhou	吉州窑	✓	✓	-	-	-	-	-	-	2
Kiln 60	Jiangxi	Jingdezhen	景德镇	✓	-	-	-	-	-	-	-	1
Kiln 107	Henan	Luoyang	洛阳窑	✓	✓	✓	✓	✓	-	-	-	5
Kiln 126	Fujian	Lianjiang	连江窑	✓	-	-	-	-	-	-	-	1
N_1:				42	32	21	17	6	3	1	1	**Total: 123**
P_1:				34.1%	26.0%	17.1%	13.8%	4.9%	2.4%	0.8%	0.8%	**100.0%**

Table 6.3: Summary Statistics for counting of Chinese ceramic classes produced from different Chinese kiln sites dated to the 11th to 12th centuries.

This table presents summary statistics for the full collected datasets of Chinese ceramic kiln sites dated from the 11^{th} to 12^{th} centuries. This table shows the 80 different Chinese ceramic kiln sites listed in Appendix 1. The counting of class numbers of this summary statistics is based on Appendix 2. In total, these 80 kiln sites produce 182 groups of ceramic assemblages, which can be divided into ten classes. '✓' refers the kiln site has produced the correspond class of ceramics; '-' refers to the kiln site has not. These ten classes have been showed on the top of this table, with other information included 'Kiln Sites Number', 'Province', and 'Kiln Name'. The 'Kiln Number' refers to their numbers of these ceramic kiln sites, which can be found in Appendixes 1 and 2. The 'Province' means the Chinese provincial locations of these sites. The 'Kiln Name' tells their English and Chinese names. Ceramic classes in this table include ***G (green glazed wares, or celadon), Y (yellow glazed wares), B (black glazed wares), W (white glazed wares), S (Sancai-type wares), P (polychrome wares), Q (Qingbai wares), F (Cizhou type sgraffiato wares) and O (other classes, such as marbled-earthenware wares).*** *These classes are based on Appendix 2 and their definitions can be found in Chapter 2: 2.5.2-(1). On the bottom, N_1 refers to the total number of each class that produced from these 80 kiln sites. P_1 means the percentage of N_1, among 182 assemblages. On the right, N_2 refers to the total number of classes produced from each kiln site.*

Kiln Site Number	Province	Kiln Name		G	Y	B	W	S	P	O	Q	F	J	N_2
Kiln 2	Fujian	Cizao	磁灶窑	✓	✓	✓	-	-	-	-	-	-	-	3
Kiln 4	Guangxi	Guilin	桂林窑	✓	✓	-	-	-	-	-	-	-	-	2
Kiln 5	Hunan	Yueyang	岳阳窑	✓	✓	-	-	-	-	-	-	-	-	2
Kiln 9	Jiangxi	Yanshan	铅山窑	-	✓	✓	-	-	-	-	-	-	-	2
Kiln 10	Sichuan	Qionglai	邛崃窑	✓	✓	-	-	-	-	-	-	-	-	2
Kiln 13	Zhejiang	Yue	越窑	✓	-	-	-	-	-	-	-	-	-	1
Kiln 14	Zhejiang	Wuzhou	婺州窑	✓	-	-	-	-	-	-	-	-	-	1
Kiln 15	Zhejiang	Ou	瓯窑	✓	-	-	-	-	-	-	-	-	-	1
Kiln 16	Hebei	Cizhou	磁州窑	-	-	✓	✓	-	-	-	-	✓	-	3
Kiln 17	Hebei	Xing	邢窑	-	✓	-	✓	-	-	-	-	-	-	2
Kiln 20	Henan	Anyang	安阳窑	-	-	-	✓	✓	-	-	-	-	-	2
Kiln 22	Shandong	Zhongchenhao	中陈郝窑	✓	-	-	✓	-	-	-	-	-	-	2
Kiln 23	Shandong	Zibo	淄博窑	✓	-	✓	✓	-	-	✓	-	-	-	4
Kiln 25	Anhui	Songkou	竦口窑	✓	-	-	-	-	-	-	-	-	-	1
Kiln 26	Anhui	Kongling	孔灵窑	✓	-	-	-	-	-	-	-	-	-	1
Kiln 27	Anhui	Qinxi	琴溪窑	✓	-	-	-	-	-	-	-	-	-	1
Kiln 28	Fujian	Jianyang	建阳窑	-	-	✓	-	-	-	-	-	-	-	1
Kiln 29	Hubei	E'zhou	鄂州窑	✓	-	-	-	-	-	-	✓	-	-	2
Kiln 30	Fujian	Guangze	光泽窑	✓	✓	✓	-	-	-	-	-	-	-	3
Kiln 32	Guangdong	Chaozhou	潮州窑	✓	✓	✓	-	-	-	-	-	-	-	3
Kiln 33	Guangdong	Xicun	西村窑	✓	✓	-	✓	-	✓	-	✓	-	-	5
Kiln 36	Guangdong	Shiwan	佛山石湾窑	✓	✓	✓	-	-	-	-	-	-	-	3
Kiln 37	Guangdong	Guanchong	官冲窑	✓	✓	-	-	-	-	-	-	-	-	2
Kiln 39	Jiangxi	Qilizhen	七里镇窑	✓	-	-	-	-	-	-	✓	-	-	2
Kiln 40	Hebei	Ding	定窑	✓	✓	✓	✓	-	-	-	-	-	-	4

Kiln Site Number	Province	Kiln Name		G	Y	B	W	S	P	O	Q	F	J	N_2
Kiln 41	Hebei	Jingxing	井陉窑	-	✓	✓	✓	-	-	✓	-	-	-	4
Kiln 43	Henan	Lushan	鲁山窑	✓	-	✓	✓	✓	-	-	-	✓	✓	6
Kiln 44	Henan	Mixian	密县窑	✓	✓	✓	✓	-	-	-	-	-	-	4
Kiln 45	Henan	Dengfeng	登封窑	✓	-	-	-	✓	-	-	-	✓	✓	4
Kiln 46	Henan	Hebi	鹤壁集窑	✓	✓	✓	✓	-	-	-	-	-	-	4
Kiln 47	Henan	Yuzhou	禹州窑	-	-	✓	✓	-	-	-	-	-	✓	3
Kiln 48	Henan	Neixiang/Deng	内乡窑/邓窑	✓	-	-	-	-	-	-	-	-	-	1
Kiln 49	Henan	Jiaxian	郏县窑	-	-	-	✓	✓	-	-	-	✓	-	3
Kiln 50	Shaanxi	Yaozhou	耀州窑	✓	✓	✓	-	-	-	-	-	-	-	3
Kiln 51	Shanxi	Hunyuan	浑源窑	-	✓	✓	✓	-	-	-	-	-	-	3
Kiln 52	Shanxi	Pingding	平定窑	-	-	✓	✓	-	-	-	-	-	-	2
Kiln 53	Anhui	Fanchang	繁昌窑	-	-	-	-	-	-	-	✓	-	-	1
Kiln 54	Anhui	Renli	仁里窑	✓	-	-	-	-	-	-	-	-	-	1
Kiln 55	Anhui	Yaotouling	摇头岭窑	✓	-	-	-	-	-	-	✓	-	-	2
Kiln 56	Anhui	Xiajian	霞间窑	-	✓	-	-	-	-	-	✓	-	-	2
Kiln 57	Hunan	Hengyang	衡阳窑	✓	-	-	-	-	-	-	-	-	-	1
Kiln 58	Jiangxi	Linjiang	临江窑	-	-	✓	✓	-	-	-	✓	-	-	3
Kiln 59	Jiangxi	Jizhou	吉州窑	-	-	✓	✓	-	-	-	✓	-	-	3
Kiln 60	Jiangxi	Jingdezhen	景德镇窑	-	✓	✓	-	-	-	-	✓	-	-	3
Kiln 61	Anhui	Xiafuqiao	下符桥窑	-	-	✓	-	-	-	-	-	-	-	1
Kiln 62	Fujian	Tong'an	同安窑	✓	-	-	-	-	-	-	-	-	-	1
Kiln 63	Guangdong	Fengkai	封开窑	✓	-	-	-	-	-	-	-	-	-	1
Kiln 64	Fujian	Shaxian	沙县窑	✓	✓	-	-	-	-	-	✓	-	-	3
Kiln 65	Fujian	Xiamen	厦门窑	✓	✓	✓	-	-	-	-	✓	-	-	4
Kiln 66	Fujian	Sanming	三明窑	-	-	-	-	-	-	-	✓	-	-	1

Kiln Site Number	Province	Kiln Name		G	Y	B	W	S	P	O	Q	F	J	N_2
Kiln 67	Fujian	Songxi	松溪窑	✓	✓	✓	-	-	-	-	-	-	-	3
Kiln 68	Guangdong	Huizhou	惠州窑	✓	✓	-	✓	-	-	-	✓	-	-	4
Kiln 69	Guangxi	Guiping	桂平窑	-	✓	-	-	-	-	-	✓	-	-	2
Kiln 71	Hubei	Jiangxia	江夏窑	✓	✓	-	✓	-	-	-	✓	-	-	4
Kiln 72	Hubei	Husi	湖泗窑	-	-	-	-	-	-	-	✓	-	-	1
Kiln 73	Hunan	Chenzhou	郴州窑	-	-	-	-	-	-	-	✓	-	-	1
Kiln 74	Hunan	Hongjiang	洪江窑	✓	-	-	-	-	-	-	-	-	-	1
Kiln 75	Sichuan	Pengxian	彭县窑	-	-	-	✓	-	-	-	-	-	-	1
Kiln 76	Zhejiang	Longquan	龙泉窑	✓	-	-	-	-	-	-	-	-	-	1
Kiln 77	Fujian	Quanzhou	泉州窑	✓	-	-	-	-	-	-	-	-	-	1
Kiln 78	Henan	Xin'an	新安窑	✓	-	-	-	-	-	-	-	-	-	1
Kiln 79	Henan	Yiyang	宜阳窑	✓	-	-	-	-	-	-	-	✓	-	2
Kiln 80	Henan	Ru	汝窑	✓	-	-	-	-	-	-	-	-	-	1
Kiln 81	Henan	Linru	临汝窑	✓	-	-	✓	-	-	-	-	-	✓	3
Kiln 83	Shanxi	Jiexiu	介休窑	✓	-	✓	✓	-	-	✓	-	-	-	4
Kiln 84	Shanxi	Mengjiajing	孟家井窑	✓	-	✓	✓	-	-	✓	-	-	-	4
Kiln 86	Fujian	Zhangzhou	漳州窑	✓	-	-	-	-	-	-	✓	-	-	2
Kiln 87	Guangdong	Qujiang	曲江窑	✓	✓	✓	-	-	-	-	-	-	-	3
Kiln 98	Jiangxi	Nanfeng	南丰窑	-	-	-	-	-	-	-	✓	-	-	1
Kiln 119	Henan	Dangyangyu	当阳峪	-	✓	-	✓	✓	-	✓	-	✓	-	5
Kiln 122	Fujian	Nanping	南平窑	✓	✓	-	-	-	-	-	✓	-	-	3
Kiln 124	Guangxi	Liuzhou	柳州窑	✓	-	-	-	-	-	-	-	-	-	1
Kiln 126	Fujian	Lianjiang	连江窑	✓	-	-	-	-	-	-	-	-	-	1
Kiln 129	Guangdong	Leizhou	雷州窑	-	-	-	-	-	✓	-	-	-	-	1
Kiln 132	Guangdong	Heyuan	河源窑	✓	✓	-	-	-	-	-	-	-	-	2

Kiln Site Number	Province	Kiln Name		G	Y	B	W	S	P	O	Q	F	J	N_2
Kiln 133	Hunan	Hengshan	衡山窑	-	-	-	-	-	✓	-	-	-	-	1
Kiln 136	Jiangxi	Quan'nan	全南窑	✓	-	-	-	-	-	-	✓	-	-	2
Kiln 137	Hunan	Lingling	零陵窑	-	✓	-	-	-	-	-	-	-	-	1
Kiln 138	Jiangxi	Nancheng	南城窑	✓	-	✓	-	-	-	-	✓	-	-	3
Kiln 139	Sichuan	Guangyuan	广元窑	-	✓	✓	-	-	-	-	-	✓	-	3
N_1:				53	31	28	24	5	3	5	22	7	4	**Total: 182**
P_1:				29.1%	17.0%	15.4%	13.2%	2.7%	1.6%	2.7%	12.1%	3.8%	2.2%	**100.0%**

Table 6.4: Summary Statistics for counting of Chinese ceramic classes produced from different Chinese kiln sites dated to the 12th to 13th centuries.

This table presents summary statistics for the full collected datasets of Chinese ceramic kiln sites dated from the 12th to 13th centuries. This table shows the 82 different Chinese ceramic kiln sites listed in Appendix 1. The counting of class numbers of this summary statistics is based on Appendix 2. In total, these 82 kiln sites produce 206 groups of ceramic assemblages, which can be divided into 11 classes. '✓' refers the kiln site has produced the correspond class of ceramics; '-' refers to the kiln site has not. These 11 classes have been showed on the top of this table, with other information included 'Kiln Sites Number', 'Province', and 'Kiln Name'. The 'Kiln Number' refers to their numbers of these ceramic kiln sites, which can be found in Appendixes 1 and 2. The 'Province' means the Chinese provincial locations of these sites. The 'Kiln Name' tells their English and Chinese names. These 11 ceramic classes in this table include ***G (green glazed wares, or celadon), Y (yellow glazed wares), B (black glazed wares), W (white glazed wares), S (Sancai-type wares), P (polychrome wares), Q (Qingbai wares), F (Cizhou type sgraffiato wares), E (Enamelled wares), J (Jun-glazed celadon wares) and O (other classes, such as marbled-earthenware wares).*** *These classes are based on Appendix 2 and their definitions can be found in Chapter 2: 2.5.2-(1). On the bottom, On the bottom, N_1 refers to the total number of each class that produced from these 82 kiln sites. P_1 means the percentage of N_1, among 206 assemblages. On the right, N_2 refers to the total number of classes produced from each kiln site.*

Kiln Site Number	Province	Kiln Name		G	Y	B	W	S	P	O	Q	F	E	J	N_2
Kiln 2	Fujian	Cizao	磁灶窑	✓	✓	✓	-	-	-	-	-	-	-	-	3
Kiln 4	Guangxi	Guilin	桂林窑	✓	✓	-	-	-	-	-	-	-	-	-	2
Kiln 9	Jiangxi	Yanshan	铅山窑	-	✓	✓	-	-	-	-	-	-	-	-	2
Kiln 13	Zhejiang	Yue	越窑	✓	-	-	-	-	-	-	-	-	-	-	1
Kiln 14	Zhejiang	Wuzhou	婺州窑	✓	-	✓	-	-	-	-	-	-	-	✓	3
Kiln 16	Hebei	Cizhou	磁州窑	-	-	✓	✓	✓	-	-	-	✓	-	-	4
Kiln 17	Hebei	Xing	邢窑	-	✓	✓	✓	-	-	-	-	-	-	-	3
Kiln 20	Henan	Anyang	安阳窑	✓	-	-	-	-	-	-	-	-	-	✓	2
Kiln 22	Shandong	Zhongchenhao	中陈郝窑	✓	✓	✓	✓	-	-	-	-	-	-	-	4
Kiln 23	Shandong	Zibo	淄博窑	-	✓	✓	✓	-	-	-	-	✓	✓	-	5
Kiln 25	Anhui	Songkou	竦口窑	✓	-	-	-	-	-	-	-	-	-	-	1
Kiln 26	Anhui	Kongling	孔灵窑	✓	-	-	-	-	-	-	-	-	-	-	1
Kiln 27	Anhui	Qinxi	琴溪窑	✓	-	-	-	-	-	-	-	-	-	-	1
Kiln 28	Fujian	Jianyang	建阳窑	-	-	✓	-	-	-	-	✓	-	-	-	2
Kiln 30	Fujian	Guangze	光泽窑	✓	✓	✓	-	-	-	-	✓	-	-	-	4
Kiln 35	Guangdong	Meixian	梅县窑	✓	✓	-	-	-	-	-	✓	-	-	-	3
Kiln 39	Jiangxi	Qilizhen	七里镇窑	✓	✓	✓	-	-	-	-	✓	-	-	-	4
Kiln 40	Hebei	Ding	定窑	-	-	-	✓	-	-	-	-	-	-	-	1
Kiln 41	Hebei	Jinxing	井陉窑	-	✓	✓	✓	-	-	✓	-	-	-	-	4
Kiln 43	Henan	Lushan	鲁山窑	-	-	✓	-	-	-	-	-	-	-	✓	2
Kiln 45	Henan	Dengfeng	登封窑	✓	-	-	-	-	-	-	-	✓	✓	✓	4
Kiln 46	Henan	Hebi	鹤壁集窑	-	-	✓	✓	-	-	-	-	-	-	-	2
Kiln 47	Henan	Yuzhou	禹州窑	✓	-	✓	✓	-	-	-	-	-	-	✓	4

Kiln Site Number	Province	Kiln Name		G	Y	B	W	S	P	O	Q	F	E	J	N_2
Kiln 48	Henan	Neixiang/Deng	内乡窑/邓窑	✓	-	-	-	-	-	-	-	-	-	-	1
Kiln 49	Henan	Jiaxian	郏县窑	-	-	-	-	-	-	-	-	✓	-	-	1
Kiln 50	Shaanxi	Yaozhou	耀州窑	✓	✓	✓	-	-	-	-	-	-	-	-	3
Kiln 51	Shanxi	Hunyuan	浑源窑	-	✓	✓	✓	-	-	✓	-	-	-	-	4
Kiln 52	Shanxi	Pinding	平定窑	-	-	✓	✓	-	-	-	-	-	-	-	2
Kiln 58	Jiangxi	Linjiang	临江窑	-	-	-	-	-	-	-	✓	✓	-	-	2
Kiln 59	Jiangxi	Jizhou	吉州窑	-	✓	✓	✓	-	-	-	-	✓	-	-	4
Kiln 60	Jiangxi	Jingdezhen	景德镇窑	-	-	-	-	-	-	-	✓	-	-	-	1
Kiln 61	Anhui	Xiafuqiao	下符桥窑	-	-	✓	-	-	-	-	-	-	-	-	1
Kiln 62	Fujian	Tong'an	同安窑	✓	-	-	✓	-	-	-	-	-	-	-	2
Kiln 65	Fujian	Xiamen	厦门窑	✓	✓	✓	-	-	-	-	✓	-	-	-	4
Kiln 66	Fujian	Sanming	三明窑	✓	✓	-	-	-	-	-	✓	-	-	-	3
Kiln 70	Guangxi	Rongxian	容县窑	-	✓	✓	-	-	-	✓	✓	-	-	-	4
Kiln 75	Sichuan	Pengxian	彭县窑	-	-	-	✓	-	-	-	-	-	-	-	1
Kiln 76	Zhejiang	Longquan	龙泉窑	✓	-	-	-	-	-	-	-	-	-	-	1
Kiln 77	Fujian	Quanzhou	泉州窑	✓	-	-	-	-	-	-	✓	-	-	-	2
Kiln 78	Henan	Xin'an	新安窑	✓	-	-	-	-	-	-	-	✓	-	-	2
Kiln 79	Henan	Yiyang	宜阳窑	✓	-	-	-	-	-	-	-	✓	-	-	2
Kiln 80	Henan	Ru	汝窑	-	-	-	✓	-	-	-	-	✓	-	-	2
Kiln 81	Henan	Linru	临汝窑	✓	✓	-	-	-	-	-	-	✓	-	✓	4
Kiln 82	Shaanxi	Xunyi	旬邑窑	✓	-	-	-	-	-	-	-	-	-	-	1
Kiln 83	Shanxi	Jiexiu	介休窑	✓	-	✓	✓	-	-	✓	-	-	-	-	4
Kiln 84	Shanxi	Mengjiajing	孟家井窑	✓	-	✓	✓	-	-	✓	-	-	-	-	4

Kiln Site Number	**Province**	**Kiln Name**		**G**	**Y**	**B**	**W**	**S**	**P**	**O**	**Q**	**F**	**E**	**J**	**N_2**
Kiln 85	Chongqing	Tushan	涂山窑	-	✓	✓	-	-	-	-	-	-	-	-	2
Kiln 86	Fujian	Zhangzhou	漳州窑	✓	✓	✓	✓	-	-	-	✓	-	-	-	5
Kiln 88	Fujian	Yincuowei	银厝尾窑	✓	✓	-	✓	-	-	-	✓	-	-	-	4
Kiln 89	Fujian	Nan'an	南安窑	✓	✓	✓	-	-	-	-	✓	-	-	-	4
Kiln 90	Fujian	Putian	莆田窑	✓	-	-	-	-	-	-	✓	-	-	-	2
Kiln 91	Fujian	Fuqing	福清窑	✓	-	✓	-	-	-	-	-	✓	-	-	3
Kiln 92	Fujian	Yongchun	永春窑	-	-	-	-	-	-	-	✓	-	-	-	1
Kiln 93	Fujian	Zhangping	漳平窑	-	-	-	-	-	-	-	✓	-	-	-	1
Kiln 94	Fujian	Minhou	闽侯窑	✓	-	✓	-	-	-	-	-	-	-	-	2
Kiln 95	Guangxi	Tengxian	藤县窑	-	✓	-	-	-	-	-	✓	-	-	-	2
Kiln 96	Guangxi	Xing'an	兴安窑	✓	✓	✓	-	-	-	-	✓	-	-	-	4
Kiln 97	Hunan	Yiyang	益阳窑	✓	-	✓	-	-	-	-	✓	-	-	-	3
Kiln 98	Jiangxi	Nanfeng	南丰窑	-	-	✓	-	-	-	-	✓	-	-	-	2
Kiln 99	Jiangxi	Nankeng	南坑窑	-	-	-	-	-	-	-	✓	-	-	-	1
Kiln 100	Sichuan	Dazhou	达州窑	✓	-	-	-	-	-	-	-	-	-	-	1
Kiln 101	Zhejiang	Guan	官窑	✓	-	-	-	-	-	-	-	-	-	-	1
Kiln 102	Hebei	Longhua	隆化窑	-	-	✓	✓	-	-	-	-	-	-	-	2
Kiln 103	Shanxi	Huozhou	霍州窑	-	-	-	✓	-	-	-	-	-	-	-	1
Kiln 104	Shanxi	Changzhi	长治窑	-	-	✓	✓	-	-	-	-	-	✓	-	3
Kiln 105	Fujian	Dehua	德化窑	-	-	-	-	-	-	-	✓	-	-	-	1
Kiln 113	Shanxi	Yuxian	盂县窑	-	-	✓	✓	-	-	✓	-	-	-	-	3
Kiln 119	Henan	Dangyangyu	当阳裕窑	-	✓	-	✓	✓	-	✓	-	✓	-	-	5
Kiln 120	Henan	Pacun	扒村窑	✓	-	-	-	-	-	-	-	✓	✓	✓	4

Kiln Site Number	Province	Kiln Name		G	Y	B	W	S	P	O	Q	F	E	J	N_2
Kiln 122	Fujian	Nanping	南平窑	-	✓	✓	-	-	-	-	✓	-	-	-	3
Kiln 123	Fujian	Pucheng	浦城窑	✓	✓	-	-	-	-	-	✓	-	-	-	3
Kiln 125	Fujian	Minqing	闽清窑	-	-	✓	-	-	-	-	✓	-	-	-	2
Kiln 126	Fujian	Lianjiang	连江窑	✓	-	✓	-	-	-	-	✓	-	-	-	3
Kiln 128	Fujian	Ningde	宁德窑	-	✓	-	✓	-	-	-	✓	-	-	-	3
Kiln 129	Guangdong	Leizhou	雷州窑	-	-	-	-	-	✓	-	-	-	-	-	1
Kiln 130	Guangdong	Nanhai	南海窑	-	-	-	-	-	✓	-	-	-	-	-	1
Kiln 131	Guangdong	Longjingkeng	龙颈坑窑	✓	✓	-	-	-	-	-	✓	-	-	-	3
Kiln 132	Guangdong	Heyuan	河源窑	✓	✓	-	-	-	-	-	-	-	-	-	2
Kiln 133	Hunan	Hengshan	衡山窑	-	-	-	-	-	✓	-	-	-	-	-	1
Kiln 136	Jiangxi	Quan'nan	全南窑	✓	-	✓	✓	-	-	-	✓	-	-	-	4
Kiln 138	Jiangxi	Nancheng	南城窑	✓	-	✓	-	-	-	-	✓	-	-	-	3
Kiln 139	Sichuan	Guangyuan	广元窑	-	✓	✓	-	-	-	-	-	✓	-	-	3
N_1:				44	30	40	25	2	3	7	30	14	4	7	**Total: 206**
P_1:				21.4%	14.6%	19.4%	12.1%	1.0%	1.5%	3.4%	14.6%	6.8%	1.9%	3.4%	**100.0%**

Table 6.5: Summary Statistics for counting of Chinese ceramic classes produced from different Chinese kiln sites dated to the 14th century.

This table presents summary statistics for the full collected datasets of Chinese ceramic kiln sites dated from the 14th century. This table shows the 55 different Chinese ceramic kiln sites listed in Appendix 1. The counting of class numbers of this summary statistics is based on Appendix 2. In total, these 55 kiln sites produce 127 groups of ceramic assemblages, which can be divided into 12 classes. '✓' refers the kiln site has produced the correspond class of ceramics; '-' refers to the kiln site has not. These 12 classes have been showed on the top of this table, with other information included 'Kiln Sites Number', 'Province', and 'Kiln Name'. The 'Kiln Number' refers to their numbers of these ceramic kiln sites, which can be found in Appendixes 1 and 2. The 'Province' means the Chinese provincial locations of these sites. The 'Kiln Name' tells their English and Chinese names. These 12 ceramic classes in this table include ***G (green glazed wares, or celadon), Y (yellow glazed wares), B (black glazed wares), W (white glazed wares), S (Sancai-type wares), P (polychrome wares), C (blue and white porcelains), Q (Qingbai wares), F (Cizhou type sgraffiato wares), E (Enamelled wares), J (Jun-glazed celadon wares) and O (other classes, such as marbled-earthenware wares).*** *These classes are based on Appendix 2 and their definitions can be found in Chapter 2: 2.5.2-(1). On the bottom, N_1 refers to the total number of each class that produced from these 55 kiln sites. P_1 means the percentage of N_1, among 127 assemblages. On the right, N_2 refers to the total number of classes produced from each kiln site.*

Kiln Site Number	Province	Kiln Name		G	Y	B	W	S	P	C	O	Q	F	E	J	N_2
Kiln 2	Fujian	Cizao	磁灶窑	✓	✓	✓	-	-	-	-	-	-	-	-	-	3
Kiln 9	Jiangxi	Yanshan	铅山窑	✓	✓	-	-	-	-	-	-	-	-	-	-	2
Kiln 14	Zhejiang	Wuzhou	婺州窑	✓	-	✓	-	-	-	-	-	-	-	-	✓	3
Kiln 16	Hebei	Cizhou	磁州窑	-	-	✓	✓	-	-	-	-	-	✓	✓	-	4
Kiln 20	Henan	Anyang	安阳窑	-	-	-	-	-	-	-	-	-	-	-	✓	1
Kiln 22	Shandong	Zhongchenhao	中陈郝窑	-	-	✓	✓	-	-	-	-	-	-	-	-	2
Kiln 28	Fujian	Jianyang	建阳窑	-	-	-	-	-	-	-	-	✓	-	-	-	1
Kiln 39	Jiangxi	Qilizhen	七里镇窑	✓	✓	✓	-	-	-	-	-	✓	-	-	-	4
Kiln 40	Hebei	Ding	定窑	-	-	-	✓	-	-	-	-	-	-	-	-	1
Kiln 41	Hebei	Jingxing	井陉窑	-	✓	✓	✓	-	-	-	✓	-	-	-	-	4
Kiln 43	Henan	Lushan	鲁山窑	-	✓	✓	✓	✓	-	-	-	-	✓	-	✓	6
Kiln 45	Henan	Dengfeng	登封窑	-	-	-	-	-	-	-	-	-	-	✓	✓	2
Kiln 46	Henan	Hebi	鹤壁集窑	-	-	✓	✓	-	-	-	✓	-	-	✓	-	4
Kiln 47	Henan	Yuzhou	禹州窑	✓	-	✓	✓	-	-	-	-	-	✓	-	✓	5
Kiln 48	Henan	Neixiang/Deng	内乡窑/邓窑	✓	-	-	-	-	-	-	-	-	-	-	-	1
Kiln 49	Henan	Jiaxian	郏县窑	-	-	-	-	-	-	-	-	-	✓	-	-	1
Kiln 50	Shaanxi	Yaozhou	耀州窑	✓	-	✓	-	-	-	-	-	-	✓	-	-	3
Kiln 51	Shanxi	Hunyuan	浑源窑	-	✓	✓	✓	-	-	-	✓	-	-	-	-	4
Kiln 58	Jiangxi	Linjiang	临江窑	✓	-	-	-	-	-	-	-	✓	✓	-	-	3
Kiln 59	Jiangxi	Jizhou	吉州窑	-	✓	✓	✓	-	-	-	-	-	✓	-	-	4
Kiln 60	Jiangxi	Jingdezhen	景德镇窑	✓	-	-	-	-	-	✓	-	✓	-	-	-	3
Kiln 62	Fujian	Tong'an	同安窑	✓	-	-	✓	-	-	-	-	-	-	-	-	2
Kiln 66	Fujian	Sanming	三明窑	-	✓	-	-	-	-	-	-	✓	-	-	-	2

Kiln Site Number	Province	Kiln Name		G	Y	B	W	S	P	C	O	Q	F	E	J	N_2
Kiln 76	Zhejiang	Longquan	龙泉窑	✓	-	-	-	-	-	-	-	-	-	-	-	1
Kiln 77	Fujian	Quanzhou	泉州窑	✓	-	-	-	-	-	-	-	✓	-	-	-	2
Kiln 78	Henan	Xin'an	新安窑	✓	-	-	✓	-	-	-	-	-	-	-	✓	3
Kiln 81	Henan	Linru	临汝窑	-	-	-	-	-	-	-	-	-	-	-	✓	1
Kiln 84	Shanxi	Mengjiajing	孟家井窑	-	-	✓	✓	-	-	-	-	-	-	-	-	2
Kiln 86	Fujian	Zhangzhou	漳州窑	✓	-	-	-	-	-	-	-	-	-	-	-	1
Kiln 88	Fujian	Yincuowei	银厝尾窑	✓	✓	-	✓	-	-	-	-	✓	-	-	-	4
Kiln 90	Fujian	Putian	莆田窑	✓	-	-	-	-	-	-	-	✓	-	-	-	2
Kiln 91	Fujian	Fuqing	福清窑	✓	-	-	-	-	-	-	-	✓	-	-	-	2
Kiln 92	Fujian	Yongchun	永春窑	-	-	-	-	-	-	-	-	✓	-	-	-	1
Kiln 93	Fujian	Zhangping	漳平窑	-	-	-	-	-	-	-	-	✓	-	-	-	1
Kiln 97	Hunan	Yiyang	益阳窑	✓	-	✓	-	-	-	-	-	✓	-	-	-	3
Kiln 99	Jiangxi	Nankeng	南坑窑	✓	-	-	-	-	-	-	-	-	-	-	-	1
Kiln 101	Zhejiang	Guan	官窑	✓	-	-	-	-	-	-	-	-	-	-	-	1
Kiln 102	Hebei	Longhua	隆化窑	-	-	✓	✓	-	-	-	-	-	-	-	-	2
Kiln 103	Shanxi	Huozhou	霍州窑	-	-	-	✓	-	-	-	-	-	-	-	-	1
Kiln 105	Fujian	Dehua	德化窑	-	-	-	-	-	-	-	-	✓	-	-	-	1
Kiln 106	Guangdong	Raoping	饶平窑	✓	-	-	-	-	-	-	-	-	-	-	-	1
Kiln 109	Jiangxi	Jing'an	靖安窑	✓	-	-	-	-	-	-	-	✓	-	-	-	2
Kiln 110	Yunnan	Yuxi	玉溪窑	✓	-	-	-	-	-	-	-	-	-	-	-	1
Kiln 120	Henan	Pacun	扒村窑	-	-	-	-	✓	-	-	-	-	✓	✓	-	3
Kiln 121	Henan	Qixian	淇县窑	-	-	-	-	-	-	-	-	-	-	-	✓	1
Kiln 122	Fujian	Nanping	南平窑	✓	-	✓	-	-	-	-	-	✓	-	-	-	3

Kiln Site Number	Province	Kiln Name		G	Y	B	W	S	P	C	O	Q	F	E	J	N_2
Kiln 123	Fujian	Pucheng	浦城窑	✓	-	✓	-	-	-	-	-	✓	-	-	-	3
Kiln 125	Fujian	Mingqing	闽清窑	-	-	✓	-	-	-	-	-	✓	-	-	-	2
Kiln 126	Fujian	Lianjiang	连江窑	✓	-	✓	-	-	-	-	-	✓	-	-	-	3
Kiln 127	Fujian	Shaowu	邵武窑	✓	✓	✓	-	-	-	-	-	✓	-	-	-	4
Kiln 128	Fujian	Ningde	宁德窑	-	✓	-	✓	-	-	-	-	✓	-	-	-	3
Kiln 129	Guangdong	Leizhou	雷州	-	-	-	-	-	✓	-	-	-	-	-	-	1
Kiln 130	Guangdong	Nanhai	南海窑	-	-	-	-	-	✓	-	-	-	-	-	-	1
Kiln 133	Hunan	Hengshan	衡山窑	-	-	-	-	-	✓	-	-	-	-	-	-	1
Kiln 136	Jiangxi	Quan'nan	全南窑	✓	-	✓	✓	-	-	-	-	✓	-	-	-	4
N_1:				28	11	21	17	2	3	1	3	21	8	4	8	**Total: 127**
P_1:				22.0%	8.7%	16.5%	13.4%	1.6%	2.4%	0.8%	2.4%	16.5%	6.3%	3.1%	6.3%	**100.0%**

Table 6.6: Summary Statistics for counting of Chinese ceramic classes produced from different Chinese kiln sites dated to the 15th to 16th centuries.

This table presents summary statistics for the full collected datasets of Chinese ceramic kiln sites dated from the 15th to 16th centuries. This table shows 30 different Chinese ceramic kiln sites listed in Appendix 1. The counting of class numbers of this summary statistics is based on Appendix 2. In total, these 30 kiln sites produce 60 groups of ceramic assemblages, which can be divided into 12 classes. '✓' refers the kiln site has produced the correspond class of ceramics; '-' refers to the kiln site has not. These 12 classes have been showed on the top of this table, with other information included 'Kiln Sites Number', 'Province', and 'Kiln Name'. The 'Kiln Number' refers to their numbers of these ceramic kiln sites, which can be found in Appendixes 1 and 2. The 'Province' means the Chinese provincial locations of these sites. The 'Kiln Name' tells their English and Chinese names. These 12 ceramic classes in this table include G (green glazed wares, or celadon), Y (yellow glazed wares), B (black glazed wares), W (white glazed wares), C (blue and white porcelains), Q (Qingbai wares), F (Cizhou type sgraffiato wares), P (polychrome wares), S (Sancai-type wares), J (Jun-glazed celadon wares), E (Enamelled wares) and O (other classes, such as marbled-earthenware wares). These classes are based on Appendix 2 and their definitions can be found in Chapter 2: 2.5.2-(1). On the bottom, N_1 refers to the total number of each class that produced from these 30 kiln sites. P_1 means the percentage of N_1, among 60 assemblages. On the right, N_2 refers to the total number of classes produced from each kiln site.

Kiln Site Number	Province	Kiln Name		G	Y	B	W	C	Q	F	P	S	J	E	O	N_2
Kiln 9	Jiangxi	Yanshan	铅山窑	✓	-	✓	-	✓	✓	-	-	-	-	-	-	4
Kiln 16	Hebei	Cizhou	磁州窑	-	-	✓	✓	-	-	✓	-	-	-	-	-	3
Kiln 22	Shandong	Zhongchenhao	中陈郝窑	-	-	✓	-	-	-	-	-	-	-	-	-	1
Kiln 36	Guangdong	Shiwan	佛山石湾窑	-	-	-	-	-	-	-	-	-	✓	-	-	1
Kiln 50	Shaanxi	Yaozhou	耀州窑	-	-	✓	✓	-	-	✓	-	-	-	-	-	3
Kiln 58	Jiangxi	Linjiang	临江窑	-	-	-	✓	✓	-	-	-	-	-	-	-	2
Kiln 60	Jiangxi	Jingdezhen	景德镇窑	✓	✓	✓	✓	✓	✓	-	✓	✓	-	✓	✓	10
Kiln 63	Guangdong	Fengkai	封开窑	-	-	-	-	✓	-	-	-	-	-	-	-	1
Kiln 66	Fujian	Sanming	三明窑	-	-	-	-	-	✓	-	-	-	-	-	-	1
Kiln 76	Zhejiang	Longquan	龙泉窑	✓	-	-	-	-	-	-	-	-	-	-	-	1
Kiln 77	Fujian	Quanzhou	泉州窑	-	-	-	-	✓	-	-	-	-	-	-	-	1
Kiln 84	Shanxi	Mengjiajing	孟家井窑	-	-	✓	✓	-	-	-	-	-	-	-	-	2
Kiln 86	Fujian	Zhangzhou	漳州窑	✓	-	-	✓	✓	✓	-	-	-	-	✓	-	4
Kiln 93	Fujian	Zhangping	漳平窑	-	-	-	-	✓	-	-	-	-	-	-	-	1
Kiln 97	Hunan	Yiyang	益阳窑	-	-	-	-	✓	-	-	-	-	-	-	-	1
Kiln 99	Jiangxi	Nankeng	南坑窑	-	-	-	-	✓	-	-	-	-	-	-	-	1
Kiln 105	Fujian	Dehua	德化窑	-	-	-	✓	-	-	-	-	-	-	-	-	1
Kiln 106	Guangdong	Raoping	饶平窑	-	-	-	-	✓	-	-	-	-	-	-	-	1
Kiln 108	Jiangxi	Hengfeng	横峰窑	✓	-	-	-	-	-	-	-	-	-	-	-	1
Kiln 110	Yunnan	Yuxi	玉溪窑	-	-	-	-	✓	-	-	-	-	-	-	-	1
Kiln 111	Yunnan	Lufeng	禄丰窑	✓	-	-	-	✓	✓	-	-	-	-	-	-	3
Kiln 112	Yunnan	Jianshui	建水窑	✓	-	-	-	✓	-	-	-	-	-	-	-	2
Kiln 114	Hunan	Huaihua	怀化窑	-	-	-	-	✓	-	-	-	-	-	-	-	1

Kiln Site Number	Province	Kiln Name		G	Y	B	W	C	Q	F	P	S	J	E	O	N_2
Kiln 115	Guangdong	Huiyang	惠阳窑	✓	✓	-	✓	-	✓	-	-	-	-	-	-	4
Kiln 116	Guangdong	Boluo	博罗窑	-	-	-	-	✓	-	-	-	-	-	-	-	1
Kiln 117	Guangdong	Jieyang	揭阳窑	-	-	-	-	✓	-	-	-	-	-	-	-	1
Kiln 118	Guangxi	Hepu	合浦窑	✓	-	-	-	-	-	-	-	-	-	-	-	1
Kiln 127	Fujian	Shaowu	邵武窑	✓	✓	✓	-	-	✓	-	-	-	-	-	-	4
Kiln 129	Guangdong	Leizhou	雷州窑	-	-	-	-	-	-	-	✓	-	-	-	-	1
Kiln 140	Guangxi	Beihai	北海窑	✓	-	-	-	-	-	-	-	-	-	-	-	1
N_1:				11	3	7	8	16	7	2	1	1	1	2	1	**Total: 60**
P_1:				18.3%	5.0%	11.7%	13.3%	26.7%	11.7%	3.3%	1.7%	1.7%	1.7%	3.3%	1.7%	**100.0%**

Appendix 5: Tables of Summary Statistics for quantities of Chinese ceramic assemblages from the key western Indian Ocean sites

Table 6.7: Summary Statistics for sherd numbers of different Chinese ceramic classes (dated from the 8th to 10th centuries) produced in different archaeological sites in the western Indian Ocean.

This table presents summary statistics for the full datasets of the archaeological sites in the western Indian Ocean that produce Chinese ceramic sherds dated from the 8th to the 10th centuries. The sherd numbers and classes grouping of this summary statistics are based on Appendix 3. This table shows over 3,400 sherds from 26 archaeological sites in the western Indian Ocean (see total number on the lower right corner of this table). In this table, there are 14 columns and they present 14 different groups of Chinese ceramics that come from different producers ***(Based on Chapter 2 and Appendix 1: KN13= Yue kilns, KN17= Xing kilns, KN18= Gongyi Kilns, KN 38= Changsha kilns, KN 40= Ding kilns, KN 60= Jingdezhen Kilns, NC=Northern Chinese Kilns, SC= Southern Chinese Kilns and GD= Guangdong local kilns)****. Based on their reported appearances of these 14 groups of Chinese ceramic sherds, they can be divided into eight classes:* ***(Polychrome= Polychrome wares, GS= green splashed wares, CBW= blue and white ceramics, White= white stonewares, Dusun= Dusun type brown glazed coarse wares, Celadon= green glazed stonewares, QB= Qingbai wares and UI= un-identified ceramics)****. All these eight classes of Chinese ceramics are unearthed from 26 different archaeological sites. On the left, the site numbers represent these sites, which can be found in Appendix 3. On the bottom,* N_1 *represents the total number of each group of ceramics that is coming from the same producer.* P_1 *refers to the percentages of each group of ceramics. Proportion means there are how many sites that produce the same group of ceramics among these 26 archaeological sites. On the right,* N_2 *represents the total numbers of Chinese ceramic sherds that produced from each site.* P_2 *represent the percentages of* N_2*. Among these sherd numbers, it can be seen descriptive numbers (such as 'small', 'some', 'common' or 'large'), which are not reported in detailed numbers. It also can be seen the approximate numbers (the numbers marked by stars, such as '10*'), which mean these sherd quantities have not been accurately recorded. Otherwise, the '✓' means that this is unknown quantity of ceramic sherds but they are reported in these sites. The descriptive numbers and unknown quantities do not count in the total sherd numbers, percentages of each class and the total number of this table. '-' means there is no Chinese ceramic finding of this group/class from this site.*

Classes	Polychrome		GS	CBW	White					BG	Celadon		QB	UI	N_2	P_2
Producers	**KN38**	**KN18**	**KN18**	**KN18**	**KN17**	**NC**	**KN40**	**KN18**	**SC**	**Dusun**	**KN13**	**GD**	**KN60**	**UI**		
Site 34	4	-	1	-	7	-	-	-	-	12	10	-	-	-	34	1.0%
Site 39	416	2*	50*	-	200*	-	✓	✓	-	1164	340	-	✓	-	2172*	62.4%
Site 45	2	-	5	-	-	-	-	-	-	-	3	-	-	-	10	0.3%
Site 48	3*	-	-	-	-	11*	-	-	-	1*	6*	-	-	-	21*	0.6%
Site 51	✓	-	-	-	-	-	-	-	-	✓	✓	-	-	-	✓	✓
Site 52	3	-	-	-	-	-	-	-	6	14	-	-	-	-	23	0.7%
Site 54	57	-	19	1	-	132	-	-	-	73	74	-	-	-	356	10.2%
Site 55	-	3	-	-	2	-	-	4	-	1	9	10	-	-	29	0.8%
Site 56	-	-	-	-	-	3	-	-	-	-	-	-	-	-	3	0.1%
Site 62	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	✓	✓
Site 67	2	-	-	-	-	-	-	-	-	-	-	-	-	-	2	0.1%
Site 79	✓	-	-	-	✓	✓	✓	-	-	100*	170*	-	-	-	270*	7.8%
Site 82	-	-	-	-	-	-	✓	-	-	✓	✓	-	-	-	✓	✓
Site 83	-	-	-	-	✓	-	-	large	-	common	✓	-	-	-	✓	✓
Site 86	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	✓	✓
Site 90	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	✓	✓
Site 91	-	-	-	-	-	-	-	-	-	some	some	-	-	-	✓	✓
Site 93	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓
Site 94	1	-	-	-	-	-	-	-	-	250*	✓	-	-	-	251*	7.2%
Site 97	-	-	-	-	-	-	-	-	-	4	-	-	-	-	4	0.1%
Site 101	8	-	10*	-	10*	-	-	-	-	✓	10*	-	-	-	38*	1.1%
Site 110	14	-	-	-	-	-	-	-	-	9	7	-	-	-	30	0.9%
Site 112	20	-	-	-	-	✓	-	-	-	288	✓	-	-	-	196	5.6%
Site 113	small	-	-	-	-	-	-	-	-	✓	✓	-	-	-	✓	✓

Classes	Polychrome		GS	CBW	White					BG	Celadon		QB	UI	N_2	P_2
Producers	**KN38**	**KN18**	**KN18**	**KN18**	**KN17**	**NC**	**KN40**	**KN18**	**SC**	**Dusun**	**KN13**	**GD**	**KN60**	**UI**		
Site 123	8	-	5	-	4	2	-	4	-	7	4	4	-	-	38	1.1%
Site 129	-	-	-	-	-	2	-	-	-	-	-	-	-	-	2	0.1%
N_1	519	5	90	1	223	150	0	8	6	1827	636	14	✓	✓	**Total: 3479**	**100.0%**
P_1	14.9%	0.1%	2.5%	0.0%	6.2%	4.1%	0.0%	0.2%	0.2%	53.2%	18.2%	0.4%	✓	✓	**100.0%**	
Proportion	16/26	2/26	5/26	1/26	16/26					18/26	18/26		1/26	1/26	**Total Site Number: 26**	

Table 6.8: Summary Statistics for sherd numbers of different Chinese ceramic classes (dated from the 11th to 13th centuries) produced in different archaeological sites in the western Indian Ocean.

This table presents summary statistics for the full datasets of the archaeological sites in the western Indian Ocean that produce Chinese ceramic sherds dated from the 11th to 13th centuries. The sherd numbers and classes grouping of this summary statistics are based on Appendix 3. This table shows over 2,500 sherds from 37 archaeological sites in the western Indian Ocean (see total number on the lower right corner of this table). In this table, there are 21 columns and they present 21 different groups of Chinese ceramics that come from different producers ***(Based on Chapter 2 and Appendix 1: KN13= Yue kilns, KN16= Cizhou kilns, KN18= Gongyi Kilns, KN33= Xicun kilns, KN40= Ding kilns, KN 50=Yaozhou Kilns, KN60= Jingdezhen Kilns, KN76= Longquan Kilns SC= Southern Chinese Kilns, GD= Guangdong local kilns, FJ=Fujian local kilns, UI=producers are not sure).*** *Based on their reported appearances of these 21 groups of Chinese ceramic sherds, they can be divided into eight classes:* ***(Polychrome= Polychrome wares, White= white stonewares, Dusun= Dusun type brown glazed coarse wares, MTB=Martabani type brown glazed coarse wares, Celadon= green glazed stonewares, QB= Qingbai wares, Black=black glazed wares and UI= un-identified ceramics)****. All these eight classes of Chinese ceramics are unearthed from 37 different archaeological sites. On the left, the site numbers represent these sites, which can be found in Appendix 3. On the bottom, N_1 represents the total number of each group of ceramics that is coming from the same producer. P_1 refers to the percentages of each group of ceramics. Proportion means there are how many sites that produce the same group of ceramics among these 37 archaeological sites. On the right, N_2 represents the total numbers of Chinese ceramic sherds that produced from each site. P_2 represent the percentages of N_2. Among these sherd numbers, it can be seen descriptive numbers (such as 'small', 'some', 'common' or 'large'), which are not reported in detailed numbers. It also can be seen the approximate numbers (the numbers marked by stars, such as '10*'), which mean these sherd quantities have not been accurately recorded. Otherwise, the '✓' means that this is unknown quantity of ceramic sherds but they are reported in these sites. The descriptive numbers and unknown quantities do not count in the total sherd numbers, percentages of each class and the total number of this table. '-' means that there is no Chinese ceramic finding of this group/class from this site.*

Classes	Polychrome		White						MTB	Dusun	Celadon							QB		Black	UI	N_2	P_2
Producers	**GD**	**KN16**	**FJ**	**SC**	**KN40**	**KN60**	**GD**	**UI**	**GD**	**GD**	**KN13**	**GD**	**KN76**	**KN50**	**KN33**	**FJ**	**UI**	**KN60**	**UI**	**KN28**	**UI**		
Site 7	-	-	-	-	-	-	-	some	-	-	-	-	-	-	-	-	-	some	-	-	-	✓	✓
Site 8	-	-	-	-	-	-	-	-	-	-	✓	-	✓	-	-	-	-	-	-	-	-	✓	✓
Site 34	-	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-	-	1	-	-	-	6	0.2%
Site 40	-	-	-	-	-	10*	-	-	-	-	10*	-	-	-	-	-	-	-	-	1	-	21*	0.8%
Site 43	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100*	-	-	-	100*		-	200*	8.0%
Site 44	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	1*	-	-	-	-	1*	0.0%
Site 45	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	0.0%
Site 51	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓
Site 52	-	-	4	72	-	-	7	-	-	-	-	28	-	-	-	-	-	-	-	-	-	111	4.5%
Site 54	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	0.0%
Site 55	-	-	12	1	-	-	-	-	-	-	-	-	-	-	-	-	-	8	-	-	-	21	0.8%
Site 65	-	-	-	-	-	-	-	-	-	6	3	9	-	-	-	-	-	-	-	-	-	18	0.7%
Site 70	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	0.0%
Site 79	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓
Site 82	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	common	-	-	-	✓	✓
Site 83	-	-	-	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓
Site 84	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓
Site 85	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓
site 87	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓
Site 88	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓
Site 89	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓

Classes	Polychrome		White						MTB	Dusun	Celadon							QB		Black	UI	N_2	P_2
Producers	**GD**	**KN16**	**FJ**	**SC**	**KN40**	**KN60**	**GD**	**UI**	**GD**	**GD**	**KN13**	**GD**	**KN76**	**KN50**	**KN33**	**FJ**	**UI**	**KN60**	**UI**	**KN28**	**UI**		
Site 90	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	✓	✓
Site 94	40*	-	100*	-	-	-	-	-	-	-	10*	-	-	✓	-	✓	-	800*	✓	40*	-	990*	39.8%
Site 95	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	3	0.1%
Site 97	-	-	-	1	-	-	3	-	-	-	-	-	-	-	-	-	-	8	-	-	-	12	0.5%
Site 98	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	✓
Site 99	-	-	-	-	many	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	✓
Site 101	-	6	-	✓	✓	✓	-	-	-	-	941	-	-	25	-	-	-	-	-	-	-	972	39.1%
Site 102	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	2	0.1%
Site 108	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	✓	-	-	-	1	0.0%
Site 110	-	-	-	-	8	-	-	-	-	-	24	-	5	-	-	-	-	22	-	-	-	59	2.4%
Site 112	-	-	-	-	-	-	-	14	-	-	1	-	-	-	-	-	-	-	-	-	-	15	0.6%
Site 123	-	-	-	20	-	-	4	-	-	-	-	2	-	-	-	-	-	14	-	-	-	40	1.6%
Site 126	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	5	0.2%
Site 127	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓	✓
Site 128	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.0%
Site 129	-	-	-	-	-	-	-	2	-	-	3	-	1	-	-	-	-	-	-	-	-	6	0.2%
N_1	40	6	116	94	9	10	14	16	✓	7	999	39	11	28	100	✓	1	853	100	41	3	**Total: 2487**	**100.0%**
P_1	1.6%	0.2%	4.7%	3.8%	0.4%	0.4%	0.6%	0.6%	✓	0.3%	40.2%	1.6%	0.4%	1.1%	4.0%	✓	0.0%	34.3%	4.0%	1.6%	0.1%	**100.0%**	
Proportion	2/37	1/37	21/37						1/37	2/37	21/37							12/37		2/37	1/37	**Total Site Number: 37**	

Table 6.9: Summary Statistics for sherd numbers of different Chinese ceramic classes (dated to the 14th Century) produced in different archaeological sites in the western Indian Ocean.

This table presents summary statistics for the full datasets of the archaeological sites in the western Indian Ocean that produce Chinese ceramic sherds dated from the 14th Century. The sherd numbers and classes grouping of this summary statistics are based on Appendix 3. This table shows over 9, 500 sherds from 81 archaeological sites in the western Indian Ocean (see total number on the lower right corner of this table). In this table, there are 23 columns and they present 23 different groups of Chinese ceramics that come from different producers ***(Based on Chapter 2 and Appendix 1: KN13= Yue kilns, KN16= Cizhou kilns, KN 40= Ding kilns, KN 60= Jingdezhen Kilns, KN 76= Longquan Kilns, KN 105= Dehua Kilns, FJ= Fujian local kilns, GD= Guangdong local kilns, SC= Southern Chinese Kilns and UI=producers are not sure)****. Based on their reported appearances of these 23 groups of Chinese ceramic sherds, they can be divided into nine classes:* ***(CBW= Chinese blue and white porcelains, Polychrome= Polychrome wares, White= white stonewares, MTB= MTB type brown glazed coarse wares, Blue=blue glazed ceramics, Celadon= green glazed stonewares, SF= Shufu bluish white porcelain, QB= Qingbai wares, and UI= un-identified ceramics)****. All these nine classes of Chinese ceramics are unearthed from 81 different archaeological sites. On the left, the site numbers represent these sites, which can be found in Appendix 3. On the bottom, N_1 represents the total number of each group of ceramics that is coming from the same producer. P_1 refers to the percentages of each group of ceramics. Proportion means there are how many sites that produce the same group of ceramics among these 81 archaeological sites. On the right, N_2 represents the total numbers of Chinese ceramic sherds that produced from each site. P_2 represent the percentages of N_2. Among these sherd numbers, it can be seen descriptive numbers (such as 'small', 'few, 'common' or 'many'), which are not reported in detailed numbers. It also can be seen the approximate numbers (the numbers marked by stars, such as '10*'), which mean these sherd quantities have not been accurately recorded. Otherwise, the '✓' means that this is unknown quantity of ceramic sherds but they are reported in these sites. The descriptive numbers and unknown quantities do not count in the total sherd numbers, percentages of each class and the total number of this table. '-' means that there is no Chinese ceramic finding of this group/class from this site.*

Classes	CBW	Polychrome		White						MTB	Blue	Celadon					SF	QB					UI	N2	P2
Producers	**KN60**	**KN16**	**UI**	**FJ**	**SC**	**KN 105**	**KN60**	**GD**	**UI**	**GD**	**KN105**	**SC**	**GD**	**KN76**	**FJ**	**UI**	**KN60**	**KN60**	**KN105**	**FJ**	**GD**	**UI**	**UI**		
Site 1	-	-	-	-	-	-	-	-	-	-	-	-	-	9	-	-	-	-	-	-	-	-	-	9	0.1%
Site 2	67	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-	72	0.8%
Site 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	few	✓	✓
Site 4	150*	-	-	-	-	225*	-	-	-	150*	-	-	-	900*	-	-	-	-	-	-	-	-	-	1425*	14.9%
Site 5	1	-	-	-	-	few	-	-	-	-	-	-	-	✓	-	-	-	-	-	9	-	-	-	10	0.1%
Site 6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	✓	✓
Site 9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	0.0%
Site 16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	2	0.0%
Site 17	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	-	-	-	-	-	-	✓	✓
Site 18	-	-	-	-	-	-	-	-	-	12*	-	-	-	73*	-	-	-	-	-	-	-	-	-	85*	0.9%
Site 19	-	-	-	-	-	-	-	-	-	-	-	-	-	25*	-	-	-	-	-	-	-	-	-	25*	0.3%
Site 22	-	-	-	-	-	1	-	-	-	1	1	-	-	10	1	-	-	-	1	-	-	-	-	15	0.2%
Site 23	-	-	-	-	-	-	-	-	1	-	-	-	-	6	1	-	-	-	-	-	-	-	-	8	0.1%
Site 24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	2	0.0%
Site 27	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	2	0.0%
Site 28	-	-	-	-	-	1	-	-	-	1	-	-	-	13	-	-	-	-	-	-	-	-	-	15	0.2%
Site 29	-	-	-	8	-	-	-	-	-	-	-	-	-	18	-	-	-	-	-	-	-	-	-	26	0.3%
Site 34	2	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	3	0.0%
Site 35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	0.0%
Site 37	-	-	-	-	-	-	-	-	-	-	-	-	3	9	-	-	-	-	-	-	-	-	-	12	0.1%
Site 38	1	-	-	-	-	-	-	-	-	-	-	6	-	12	-	-	-	8	-	-	-	-	-	27	0.3%
Site 40	-	-	-	-	-	10*	-	-	-	10*	-	-	-	10*	-	-	10*	-	-	-	-	-	-	40*	0.4%

Classes	CBW	Polychrome		White						MTB	Blue	Celadon					SF	QB					UI	N2	P2
Producers	**KN60**	**KN16**	**UI**	**FJ**	**SC**	**KN 105**	**KN60**	**GD**	**UI**	**GD**	**KN105**	**SC**	**GD**	**KN76**	**FJ**	**UI**	**KN60**	**KN60**	**KN105**	**FJ**	**GD**	**UI**	**UI**		
Site 41	-	-	-	-	-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	-	-	10	0.1%
Site 42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	2	0.0%
Site 45	-	-	-	-	-	-	-	2	-	3	-	-	-	2	-	-	-	-	-	-	-	-	-	7	0.1%
Site 46	-	-	-	-	-	-	-	-	-	-	-	-	-	100*	-	-	-	-	-	-	-	-	-	100*	1.0%
Site 47	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	2	0.0%
Site 49	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1	0.0%
Site 50	2	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	2	0.0%
Site 51	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	✓	✓
Site 52	2	-	-	-	24	-	2	-	-	295	-	-	-	328	-	-	-	54	80	-	-	-	-	785	8.2%
Site 53	10	-	-	-	-	-	-	-	-	-	-	-	-	13	-	-	-	2	-	-	-	-	-	25	0.3%
Site 54	-	-	-	-	-	-	-	-	-	-	-	-	-	15	-	-	-	-	-	-	-	-	-	15	0.2%
Site 55	1	-	-	3	-	-	-	-	-	2	-	-	-	41	4	-	-	-	-	-	-	-	-	51	0.5%
Site 57	-	-	-	10*	-	-	-	-	-	-	-	-	-	50*	-	-	-	-	-	-	-	-	-	60*	0.6%
Site 65	-	-	-	-	9	11	-	-	-	-	-	-	-	12	-	-	-	-	-	-	-	-	-	32	0.3%
Site 68	-	-	-	-	-	2	-	-	-	64	-	-	-	-	-	-	-	-	-	-	-	-	-	66	0.7%
Site 69	-	-	-	-	-	-	-	-	-	8	-	-	400*	600*	-	-	-	-	many	-	-	-	-	1008*	10.6%
Site 70	-	-	-	-	-	-	-	-	-	14	-	-	-	15	-	-	-	-	-	-	-	-	-	29	0.3%
Site 71	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	✓	✓
Site 72	-	-	-	-	-	-	-	-	-	-	-	-	-	1*	-	-	-	-	-	-	-	-	-	1*	0.0%
Site 73	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	✓	✓
Site 75	-	-	-	-	-	-	-	-	-	✓	-	-	-	1*	-	-	-	-	-	-	-	-	-	1*	0.0%
Site 77	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	-	-	-	-	✓	✓

Classes	CBW	Polychrome		White						MTB	Blue	Celadon					SF	QB					UI	N2	P2
Producers	**KN60**	**KN16**	**UI**	**FJ**	**SC**	**KN 105**	**KN60**	**GD**	**UI**	**GD**	**KN105**	**SC**	**GD**	**KN76**	**FJ**	**UI**	**KN60**	**KN60**	**KN105**	**FJ**	**GD**	**UI**	**UI**		
Site 79	-	-	-	-	-	-	-	-	-	-	-	-	-	20*	-	-	-	-	-	-	-	-	-	20*	0.2%
Site 83	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	3	0.0%
Site 84	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	✓	✓
Site 85	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	✓	✓
Site 86	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	✓	✓
Site 87	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	✓	✓
Site 88	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	✓	✓
Site 89	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	✓	✓
Site 91	-	-	-	-	-	-	-	-	-	-	-	-	-	Scarce	-	-	-	-	-	-	-	-	-	✓	✓
Site 93	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	✓	✓
Site 94	-	-	-	-	-	-	-	-	-	-	-	-	-	300*	-	-	-	-	-	✓	✓	-	-	300*	3.1%
Site 96	✓	-	-	-	-	-	-	-	✓	✓	-	-	-	✓	-	✓	-	-	-	-	-	✓	-	✓	✓
Site 97	-	1	-	17	3	-	-	-	-	35	-	-	12	99	21	-	-	2	11	-	-	-	-	201	2.1%
Site 98	✓	-	-	-	-	-	-	-	-	-	-	-	-	small	-	-	-	-	-	-	-	-	-	✓	✓
Site 99	✓	-	-	-	-	-	-	-	-	many	-	-	-	many	-	-	1	-	1	-	-	-	-	2	0.0%
Site 101	298	-	-	-	-	-	-	-	-	-	-	-	-	2394	-	-	-	-	-	-	-	-	-	2694*	28.2%
Site 102	3	✓	-	-	-	-	-	-	-	-	-	-	-	7*	-	-	-	-	3	-	-	-	-	13*	0.1%
Site 107	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓
Site 108	18	2	-	-	-	-	-	-	2*	-	-	-	-	28*	-	-	1	-	✓	-	-	-	-	51*	0.5%
Site 109	-	-	-	-	-	-	-	-	-	14	-	-	-	137	-	-	-	-	-	-	-	-	-	151	1.6%
Site 110	-	-	-	-	-	-	-	-	-	69	-	-	-	74	-	-	-	5	4	-	-	-	-	152	1.6%
Site 111	20	1	1	-	-	-	-	-	-	2	-	-	-	439	30	-	-	2	2	-	-	-	-	497	5.2%

Classes	CBW	Polychrome		White						MTB	Blue	Celadon					SF	QB					UI	N2	P2
Producers	**KN60**	**KN16**	**UI**	**FJ**	**SC**	**KN 105**	**KN60**	**GD**	**UI**	**GD**	**KN105**	**SC**	**GD**	**KN76**	**FJ**	**UI**	**KN60**	**KN60**	**KN105**	**FJ**	**GD**	**UI**	**UI**		
Site 112	-	-	-	-	-	-	-	-	-	250	-	-	-	10	-	-	-	1	-	-	-	-	-	261	2.7%
Site 114	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	✓	-	✓	✓
Site 115	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	✓	-	✓	✓
Site 116	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	✓	-	✓	✓
Site 117	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	✓	-	✓	✓
Site 118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	✓	-	✓	✓
Site 119	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	✓	-	✓	✓
Site 120	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	✓	-	✓	✓
Site 121	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	✓	-	✓	✓
Site 122	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	4	0.0%
Site 123	-	-	-	-	-	-	-	-	-	-	-	-	7	21	-	-	-	1	7	-	-	-	-	36	0.4%
Site 126	12	-	-	3	-	-	-	-	-	-	-	-	-	94	-	-	-	-	-	4	-	-	-	113	1.2%
Site 127	40	-	-	✓	-	-	93*	-	-	171	-	-	-	695*	-	-	-	-	-	-	-	-	-	999*	10.5%
Site 128	-	-	-	-	7	-	-	-	-	-	-	-	-	35	-	-	-	-	-	-	-	-	-	42	0.4%
Site 129	18	-	-	-	4	-	-	-	-	1	-	-	-	4	-	-	-	-	-	-	-	-	11	38	0.4%
N1	**645**	4	1	41	47	**250**	**95**	2	3	**1102**	1	6	422	**6648**	59	5	12	75	**110**	**13**	✓	✓	11	**Total: 9552**	**100.0%**
P1	6.8%	0.0%	0.0%	0.4%	0.5%	2.6%	1.0%	0.0%	0.0%	11.5%	0.0%	0.1%	4.4%	69.6%	0.6%	0.1%	0.1%	0.8%	1.2%	0.1%	0.0%	0.0%	0.1%	**100.0%**	
Proportion	20/81	4/81		20/81						21/81	1/81	76/81 (KN 76: 63/81)					4/81	27/81					2/81	**Total Site Number: 81**	

Table 6.10: Summary Statistics for sherd numbers of different Chinese ceramic classes (dated to the 15th Century) produced in different archaeological sites in the western Indian Ocean.

This table presents summary statistics for the full datasets of the archaeological sites in the western Indian Ocean that produce Chinese ceramic sherds dated from the 15th Century. The sherd numbers and classes grouping of this summary statistics are based on Appendix 3. This table shows over 1,000 sherds from 17 archaeological sites in the western Indian Ocean (see total number on the lower right corner of this table). In this table, there are nine columns and they present nine different groups of Chinese ceramics that come from different producers ***(Based on Chapter 2 and Appendix 1: KN60= Jingdezhen Kilns, KN76= Longquan Kilns, FJ= Fujian local kilns, GD= Guangdong local kilns)****. Based on their reported appearances of these nine groups of Chinese ceramic sherds, they can be divided into six classes:* ***(CBW= Chinese blue and white porcelains, White= white stonewares, MTB= MTB type brown glazed coarse wares, Celadon= green glazed stonewares, CR= Copper-Red Porcelains and QB= Qingbai wares)****. All these six classes of Chinese ceramics are unearthed from 17 different archaeological sites. On the left, the site numbers represent these sites, which can be found in Appendix 3. On the bottom, N_1 represents the total number of each group of ceramics that is coming from the same producer. P_1 refers to the percentages of each group of ceramics. Proportion means there are how many sites that produce the same group of ceramics among these 17 archaeological sites. On the right, N_2 represents the total numbers of Chinese ceramic sherds that produced from each site. P_2 represent the percentages of N_2. Among these sherd numbers, it can be seen descriptive numbers (such as some'), which are not reported in detailed numbers. It also can be seen the approximate numbers (the numbers marked by stars, such as '6*'), which mean these sherd quantities have not been accurately recorded. Otherwise, the '✓' means that this is unknown quantity of ceramic sherds but they are reported in these sites. The descriptive numbers and unknown quantities do not count in the total sherd numbers, percentages of each class and the total number of this table. '-' means that there is no Chinese ceramic finding of this group/class from this site.*

Classes	CBW	White		MTB	Celadon			CR	QB	N_2	P_2
Producers	**KN60**	**FJ**	**KN60**	**GD**	**GD/FJ**	**KN76**	**UI**	**KN60**	**KN60**		
Site 29	-	-	-	-	4	-	-	-	-	4	0.4%
Site 52	-	-	-	-	-	317	-	-	-	317	29.1%
Site 53	11	-	-	-	-	26	-	-	-	37	3.4%
Site 55	1	-	-	-	-	20	-	-	-	21	1.9%
Site 69	some	-	-	-	-	-	-	-	-	✓	✓
Site 97	-	-	-	-	1	90	-	-	-	91	8.4%
Site 101	60	-	-	-	-	-	-	-	-	60	5.5%
Site 105	-	✓	-	✓	-	✓	-	-	-	✓	✓
Site 108	-	-	-	-	-	6*	-	-	-	6*	0.6%
Site 109	-	-	-	-	-	-	-	-	2	2	0.2%
Site 110	-	-	-	-	-	103	-	2	-	105	9.6%
Site 111	1	-	-	-	-	294	-	1	-	296	27.2%
Site 123	-	-	1	-	-	39	-	-	-	40	3.7%
Site 124	2	-	-	-	-	-	-	-	-	2	0.2%
Site 125	-	-	-	-	-	-	8	-	-	8	0.7%
Site 126	75	-	-	-	10	-	-	-	-	85	7.8%
Site 127	-	-	-	-	-	15	-	-	-	15	1.4%
N_1	150	✓	1	✓	15	910	8	3	2	**Total: 1089**	**100.0%**
P_1	13.7%	✓	0.1%	✓	1.4%	82.9%	0.7%	0.3%	0.2%	**100.0%**	
Proportion	7/17	2/17		1/17	13/17			2/17	1/17	**Total Site Number: 17**	

Table 6.11: Summary Statistics for sherd numbers of different Chinese ceramic classes (dated from the 16th to 17th Centuries) produced in different archaeological sites in the western Indian Ocean.

This table presents summary statistics for the full datasets of the archaeological sites in the western Indian Ocean that produce Chinese ceramic sherds dated to the period from the 16th to the 17th Centuries. The sherd numbers and classes grouping of this summary statistics are based on Appendix 3. This table shows over 4,700 sherds from 48 archaeological sites in the western Indian Ocean (see total number on the lower right corner of this table). In this table, there are 16 columns and they present 16 different groups of Chinese ceramics that come from different producers ***(Based on Chapter 2 and Appendix 1: KN60= Jingdezhen Kilns, KN76= Longquan Kilns, FJ= Fujian local kilns, GD= Guangdong local kilns)****. Based on their reported appearances of these nine groups of Chinese ceramic sherds, they can be divided into seven classes:* ***(CBW= Chinese blue and white porcelains, White= white stonewares, MTB= MTB type brown glazed coarse wares, Celadon= green glazed stonewares, CR= Copper-Red Porcelains and QB= Qingbai wares and UI= un-identified ceramics)****. All these seven classes of Chinese ceramics are unearthed from 48 different archaeological sites. On the left, the site numbers represent these sites, which can be found in Appendix 3. On the bottom, N_1 represents the total number of each group of ceramics that is coming from the same producer. P_1 refers to the percentages of each group of ceramics. Proportion means there are how many sites that produce the same group of ceramics among these 48 archaeological sites. On the right, N_2 represents the total numbers of Chinese ceramic sherds that have been produced from each site. P_2 represent the percentages of N_2. Among these sherd numbers, it can be seen descriptive numbers (such as some'), which are not reported in detailed numbers. It also can be seen the approximate numbers (the numbers marked by stars, such as '6*'), which mean these sherd quantities have not been accurately recorded. Otherwise, the '✓' means that this is an unknown quantity of ceramic sherds but they are reported in these sites. The descriptive numbers and unknown quantities do not count in the total sherd numbers, percentages of each class and the total number of this table. '-' means that there is no Chinese ceramic finding of this group/class from this site.*

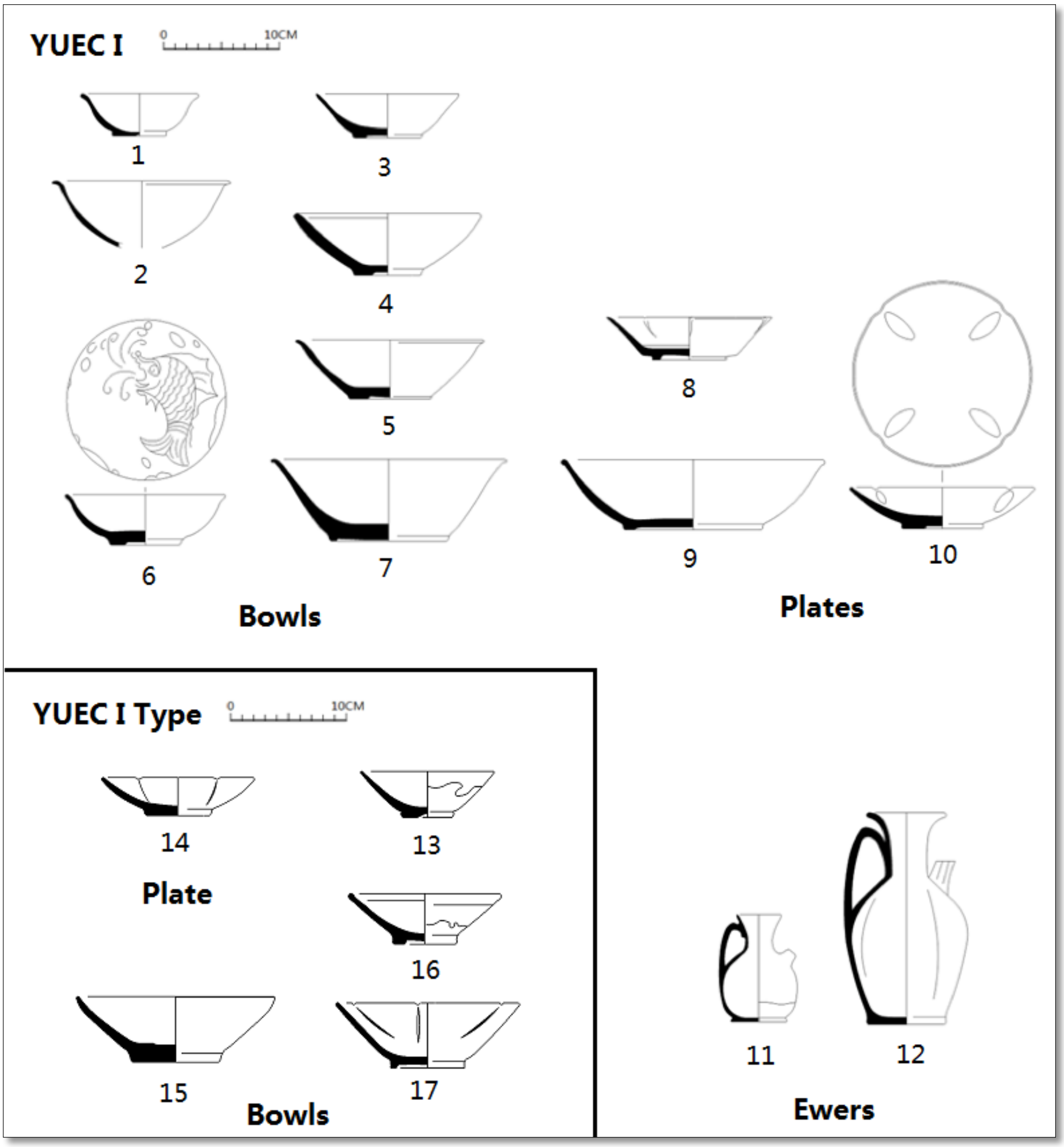
Classes	CBW					White				Enamelled		MTB	Celadon		QB	UI	N_2	P_2
Producers	**KN60**	**KN86**	**FJ**	**GD**	**UI**	**KN105**	**KN60**	**SC**	**UI**	**KN60**	**UI**	**GD**	**KN76**	**KN60**	**SC**	**UI**		
Site 1	3	-	-	-	-	1	-	-	-	4	-	-	-	-	-	-	8	0.2%
Site 10	✓	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	✓
Site 18	460	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	464	9.7%
Site 19	92	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	93	1.9%
Site 23	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1	0.0%
Site 24	3	9	-	5	-	-	-	4	-	-	-	-	-	-	-	-	21	0.4%
Site 25	-	-	-	-	10	-	-	-	-	-	-	-	-	-	-	-	10	0.2%
Site 26	-	-	-	-	30	-	-	-	-	-	-	-	-	-	-	-	30	0.6%
Site 27	3	-	-	-	-	-	7	-	-	-	-	-	-	-	-	-	10	0.2%
Site 31	8	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	9	0.2%
Site 36	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	26	0.5%
Site 37	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	0.0%
Site 38	9	-	-	-	-	-	3	4	-	2	-	-	-	-	-	-	18	0.4%
Site 47	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓
Site 52	577	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	577	12.1%
Site 53	430	-	-	-	-	-	6	1	-	-	-	-	-	1	-	-	438	9.2%
Site 54	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.0%
Site 55	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	33	0.7%
Site 57	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20	0.4%
Site 58	-	-	-	-	-	-	-	-	-	-	25	-	-	-	-	-	25	0.5%
Site 65	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	0.1%
Site 66	-	-	-	-	50	-	-	-	-	-	7	-	-	-	-	-	57	1.2%

Classes	CBW					White				Enamelled		MTB	Celadon		QB	UI	N_2	P_2
Producers	**KN60**	**KN86**	**FJ**	**GD**	**UI**	**KN105**	**KN60**	**SC**	**UI**	**KN60**	**UI**	**GD**	**KN76**	**KN60**	**SC**	**UI**		
Site 68	407	-	-	-	-	-	-	-	-	-	16	-	-	-	-	-	423	8.8%
Site 69	700	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	700	14.6%
Site 70	40	-	-	-	-	-	-	-	5	-	-	-	-	-	-	-	45	0.9%
Site 73	-	-	-	-	✓	-	-	-	-	-	Some	-	-	-	-	-	✓	✓
Site 74	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	✓	✓
Site 76	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	✓	✓
Site 79	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓
Site 80	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	2	0.0%
Site 93	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	✓	✓
Site 95	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	✓	✓
Site 97	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	0.0%
Site 98	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓
Site 99	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓
Site 100	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	✓	✓
Site 101	800	-	-	-	-	-	-	-	-	36	-	-	-	-	-	-	836	17.5%
Site 103	5	-	3	-	-	-	-	-	-	1	-	-	-	-	-	-	9	0.2%
Site 105	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	✓	✓
Site 106	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	0.1%
Site 108	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50	1.0%
Site 109	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11	0.2%
Site 111	447	-	-	-	-	-	6	-	-	1	-	12	4	-	-	-	470	9.8%
Site 112	43	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	43	0.9%

Classes	CBW					White				Enamelled		MTB	Celadon		QB	UI	N_2	P_2
Producers	**KN60**	**KN86**	**FJ**	**GD**	**UI**	**KN105**	**KN60**	**SC**	**UI**	**KN60**	**UI**	**GD**	**KN76**	**KN60**	**SC**	**UI**		
Site 123	174	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	175	3.7%
Site 125	68	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	75	1.6%
Site 126	13	-	-	-	-	-	5	-	-	1	-	48	-	-	-	-	67	1.4%
Site 128	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20	0.4%
N_1	4457	9	3	6	90	1	28	10	5	51	48	60	5	1	1	7	**Total: 4782**	100.0%
P_1	93.2%	0.2%	0.1%	0.1%	1.9%	0.0%	0.6%	0.2%	0.1%	1.1%	1.0%	1.3%	0.1%	0.0%	0.0%	0.1%	**100.0%**	
Proportion	43/48					11/48				15/48		3/48	3/48		1/48	1/48	**Total Site Number: 48**	

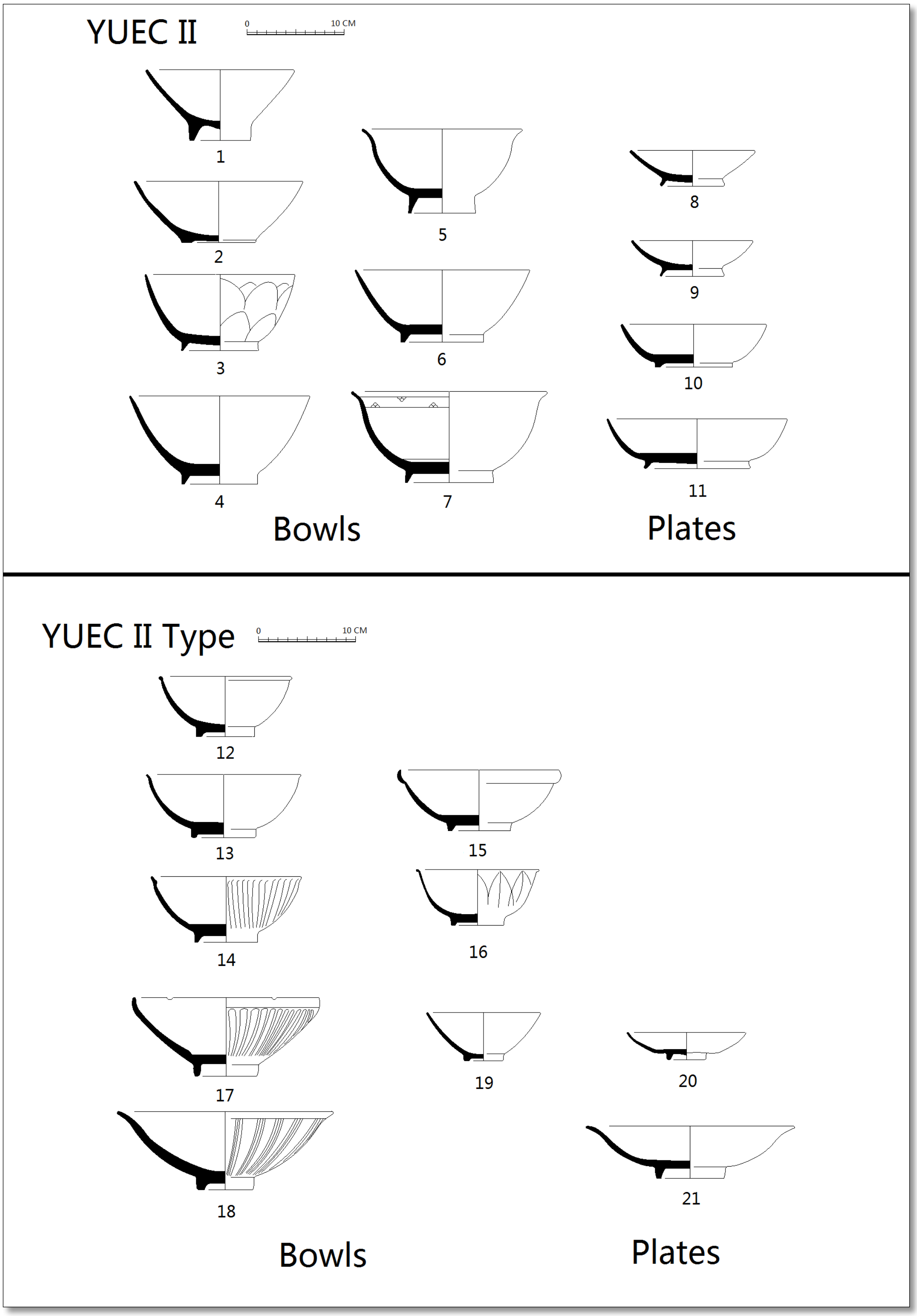
Appendix 6: Selected and Principal Shapes of Chinese Trade ceramics:

Drawings/Re-drawings by Ran Zhang



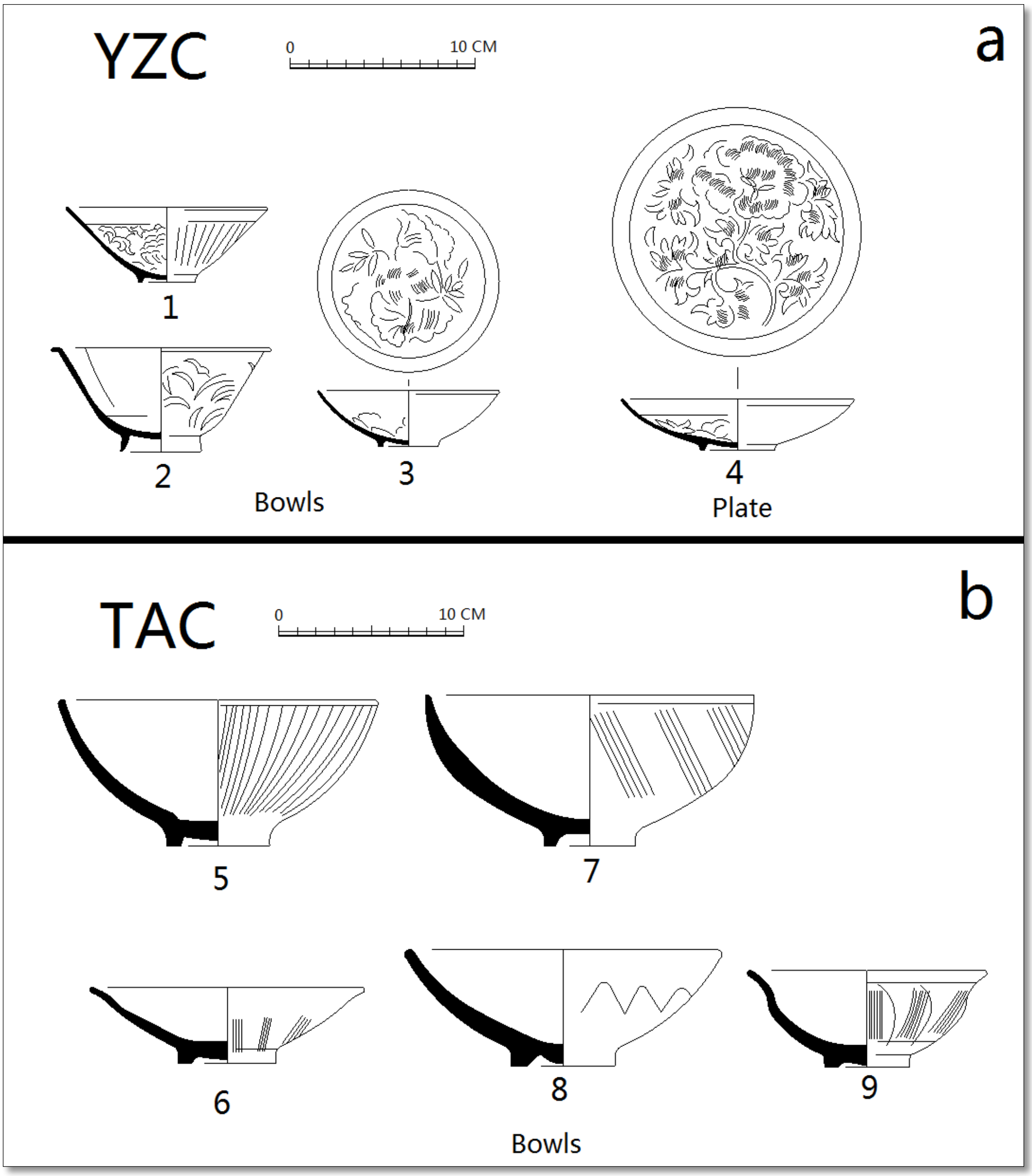
Drawing 1: Bowls, plates and ewers of early Yue celadon classes (YUEC I & YUEC I Type).

1-2= Qiankuan Tomb, Lin'an Zhejiang (AD 900)(Chen and Yi 1979:23), 3, 5, 7 & 8=Silongkou Kilns Site (group 1), Cixi, Zhejiang (ZJSKWWKGYJS et al. 2002:338), 4=Wujun Tomb, Chaohu, Anhui (AD 842)(Zhang 1988:524), 6 & 10=Zhengxun Tomb, Yanshi, Henan (AD 778) (Xu 1996:9), 9=Shenshi Tomb, Nantian, Zhejiang (AD 817)(Fu and Gu 1990:1049), 11-12= Yin Fujun Tomb, Zhenjiang, Jiangsu (AD 826) (ZJBWG 1985:133), 13=Changsha kilns (CSYKTZ 1996:53), 14-15=Meixian kilns (Yang 1994:232) and 16-17=Niupilun Kilns (Fu et al. 1990:36).



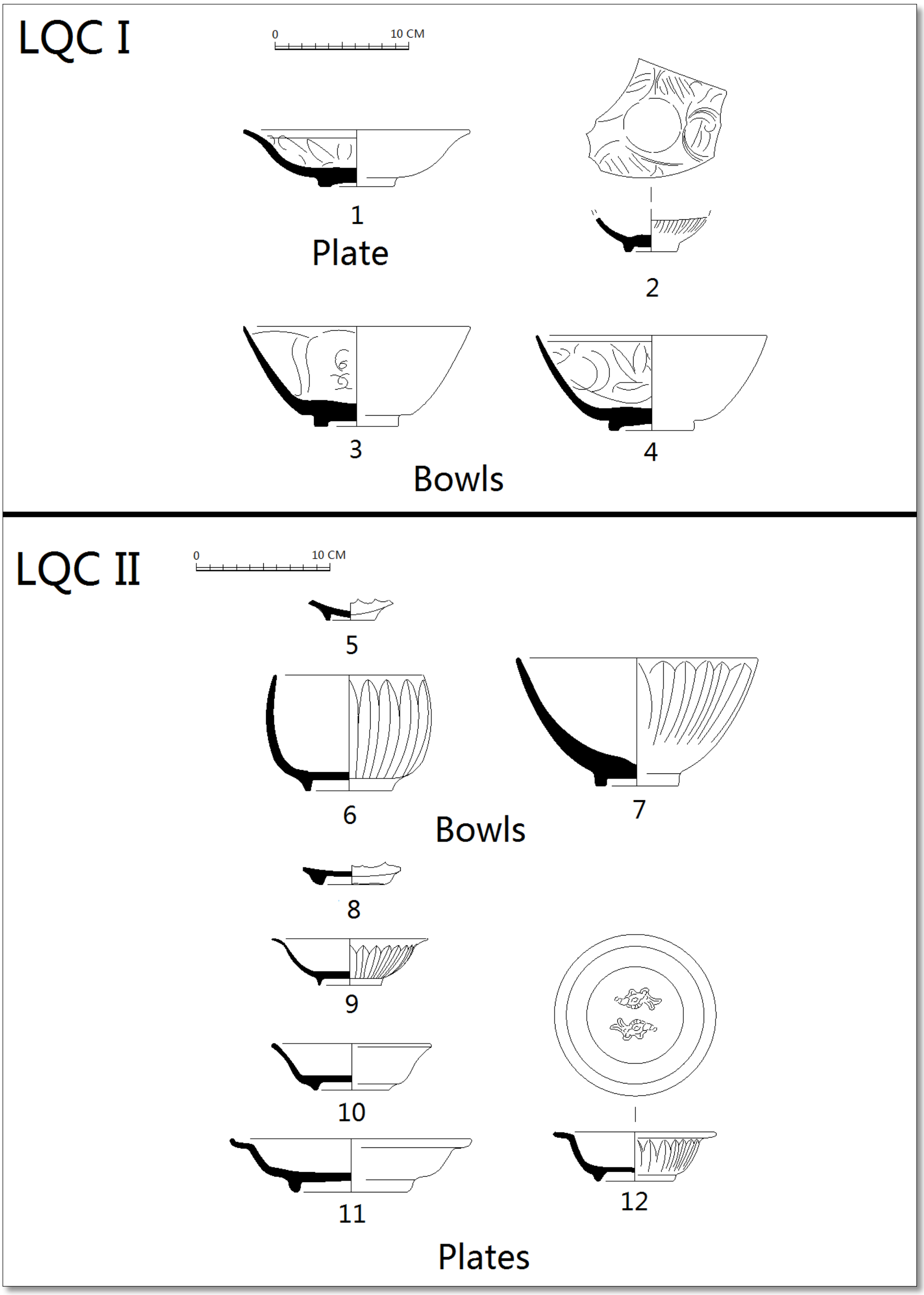
Drawing 2: Bowls and plates of Yue celadon classes (YUEC II & YUEC II Type).

1-11= Silongkou Kilns Site (groups 2 to 5), Cixi, Zhejiang (ZJSKWWKGYJS et al. 2002:338); 12-16=Xicun Kilns, Guangdong (cf. GZSWWGLWYH and AMOCUH 1987), 17,18 & 21=Huizhou Kilns, Guangdong (FPSM 1985:45, cf. Zeng and Wu 1977) and 19-20=Meixian Celadon (Yang 1994:235).



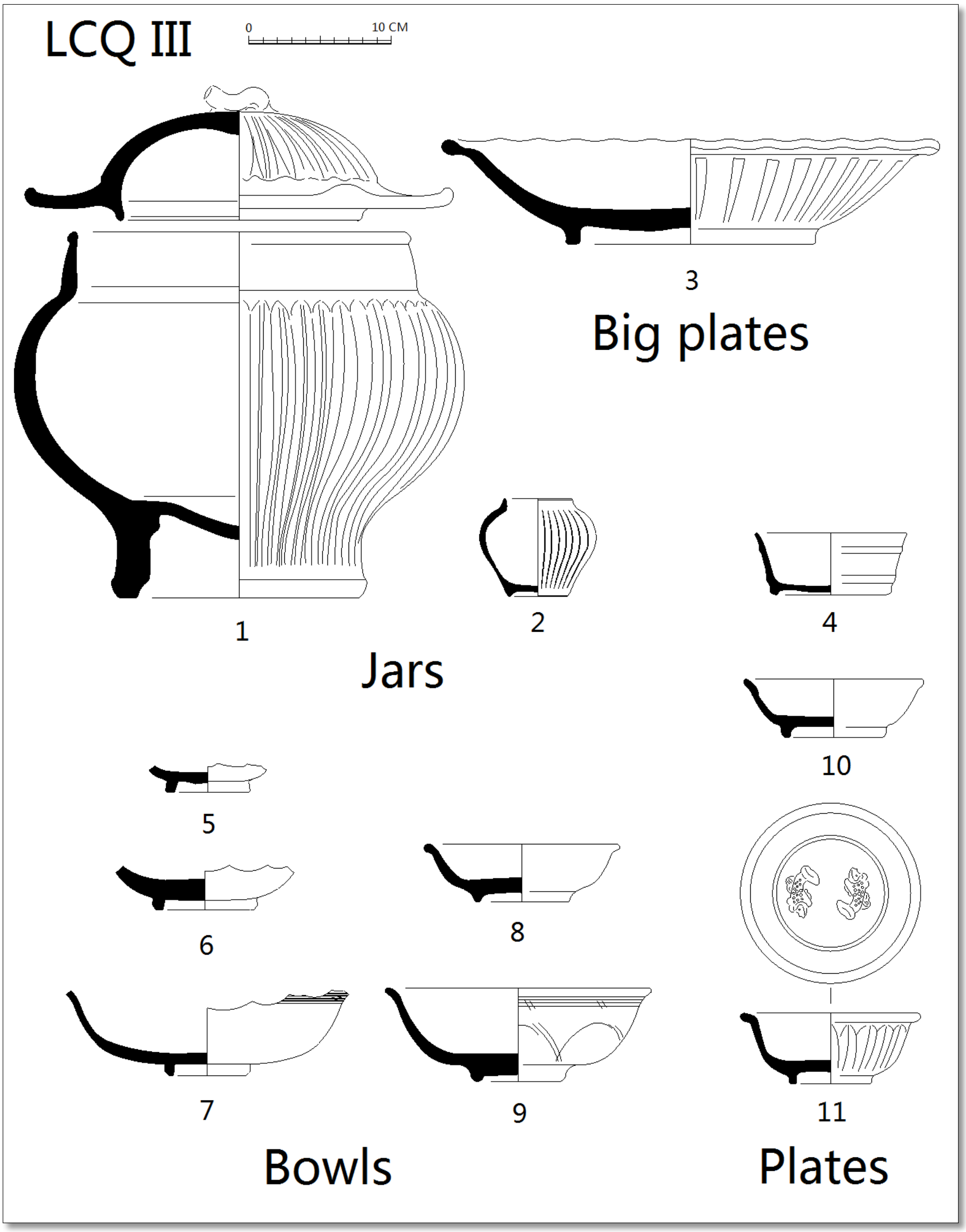
Drawing 3: Bowls and plate of Yaozhou celadon and Tong'an celadon wares (YZC & TAC).

1-4=Yaozhou kilns, Shaanxi (cf. SXSKGYJS and YZYBWG 1998) and 5-9=Tong'an Kilns, Fujian (cf. Li 1974)



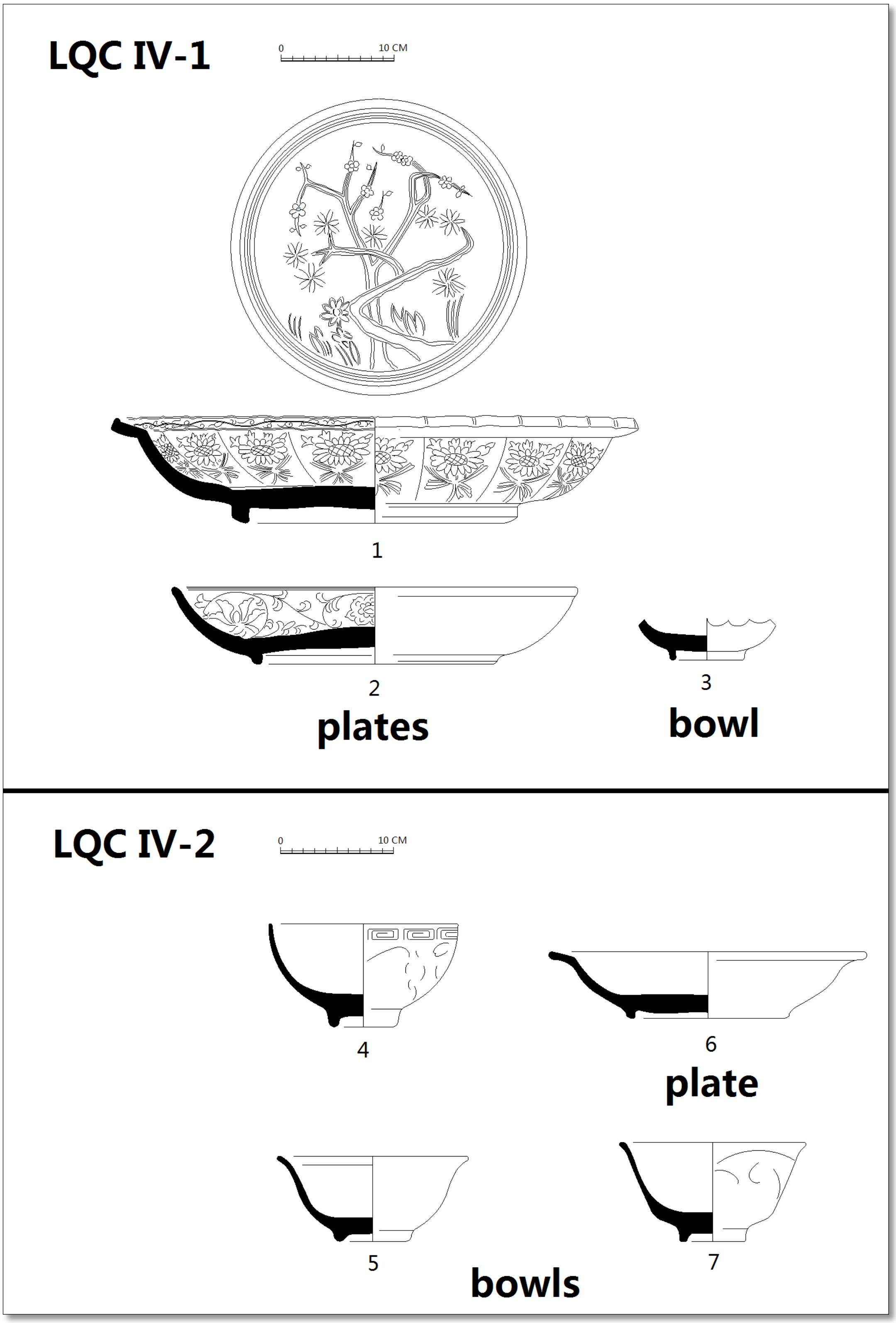
Drawing 4: Bowls and plates of Longquan celadon (LQC I & LQC II).

1, 3-4= Longquan Dongqu kilns (Phase 1), Longquan (ZJSWWKGYJS 2005); 2, 7 & 10-12 =Jincun Kilns, Longquan (cf. Zhang 1989a) and 5, 6, 8 & 9= the Williamson Collections (sherd numbers from up to down are +4441 K103X, +4450 K103A, +4460 K103 and +4426 K103).



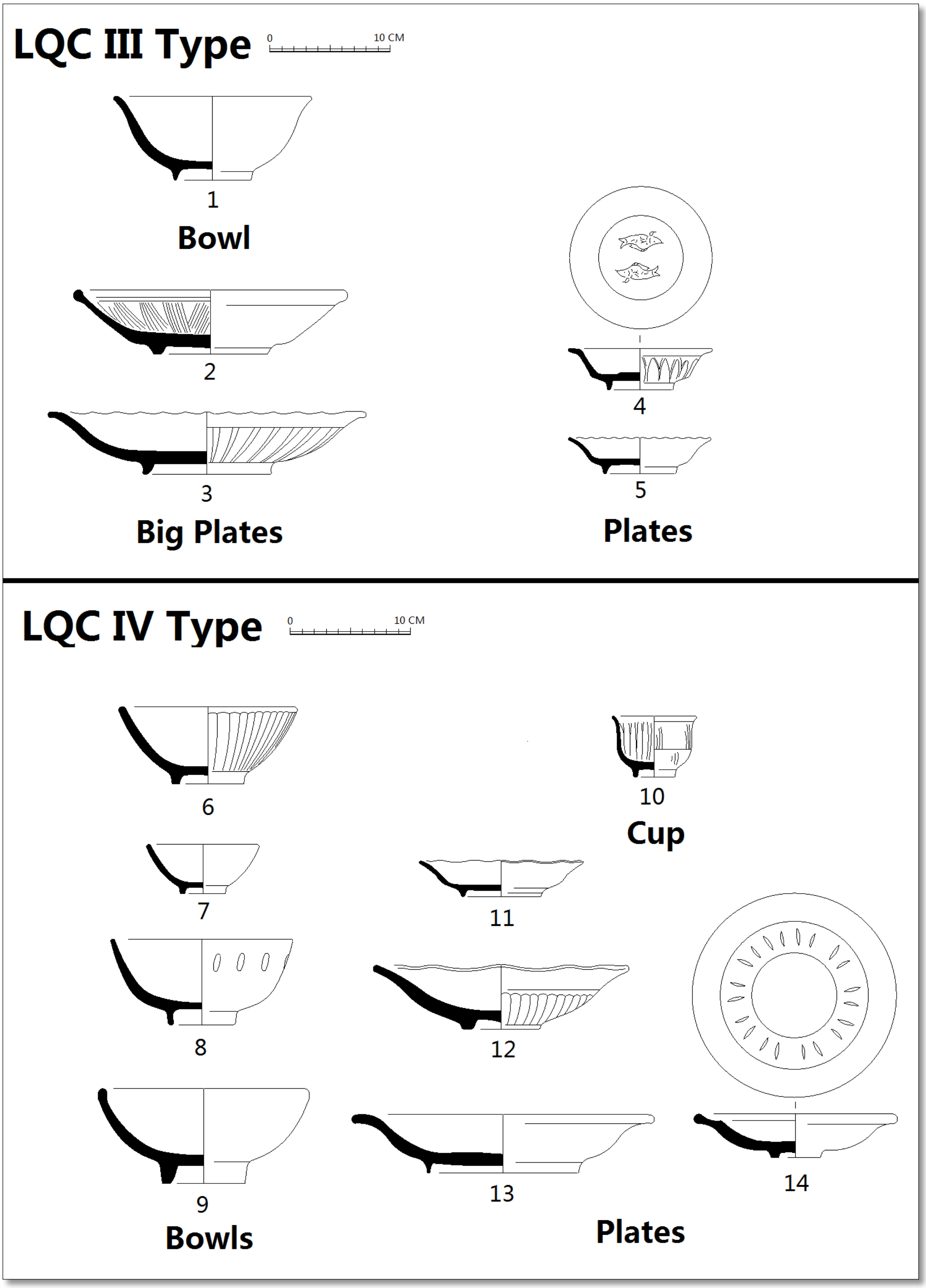
Drawing 5: Bowls, plates and Jars of Longquan celadon (LQC III).

1= North Valley, Imakojinishi, Kamakura, Japan (Kamei 1994:78), 2, 5, 6 & 7= the Williamson Collections (Sherd numbers from up to down are +4476 K103, +1274 AE3, +1271 AE1 and +11846 A17), 3, 4, 8, 10 & 11= Jincun Kilns, Longquan (cf. Zhang 1989a) and 9= Longquan Dongqu kilns (Phase 3-7), Longquan (ZJSWWKGYJS 2005).



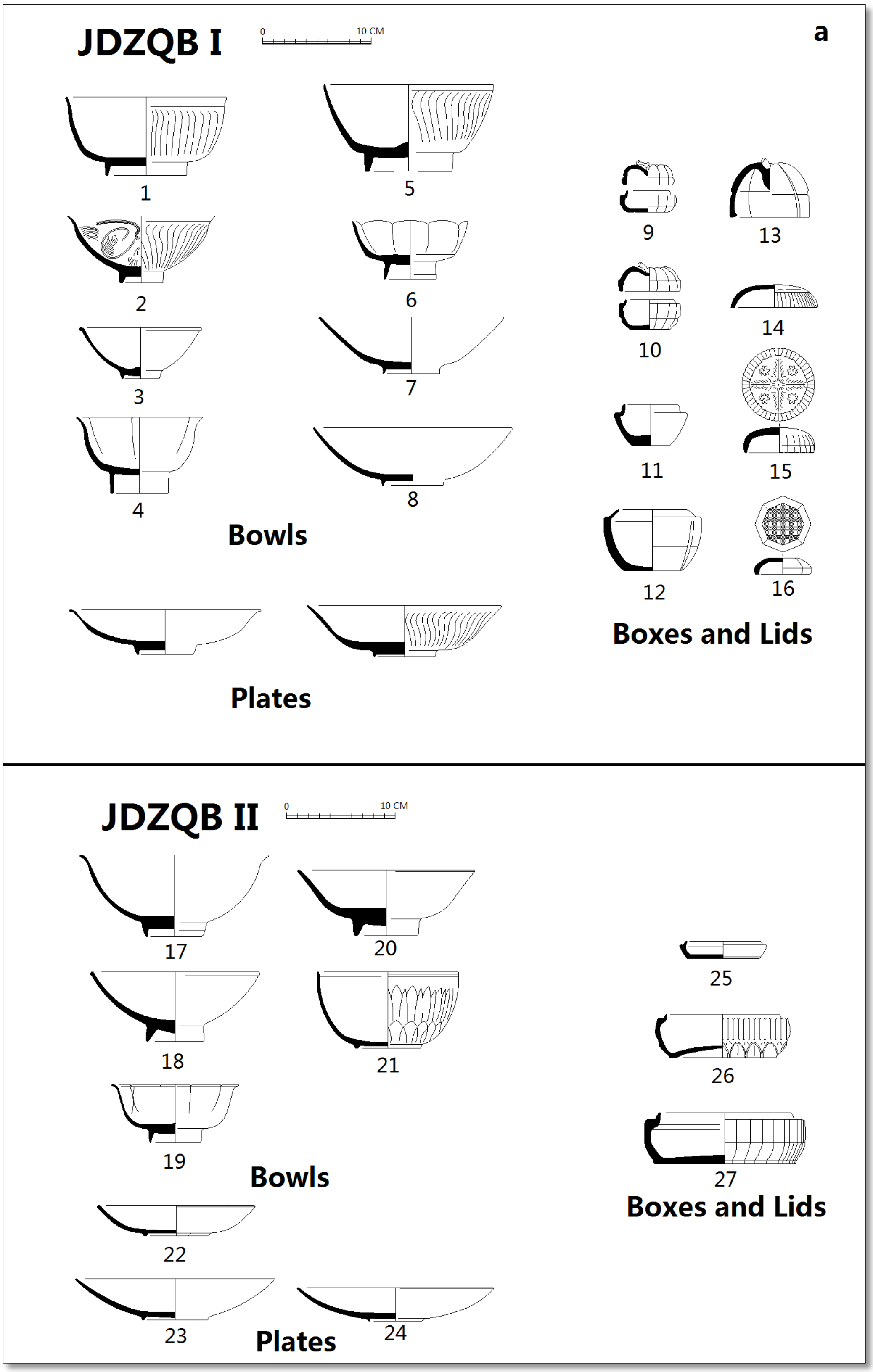
Drawing 6: Bowls and plates of late Longquan celadon (LQC IV-1 and LQC IV-2).

1-2= Fengdongyan kilns, Longquan (cf. ZJSWWKGYJS et al. 2009), 3= the Williamson Collections (sherd number + 1326 AE1) and 4-7=Longquan Dongqu kilns, Longquan (ZJSWWKGYJS 2005:Phase 4-8).



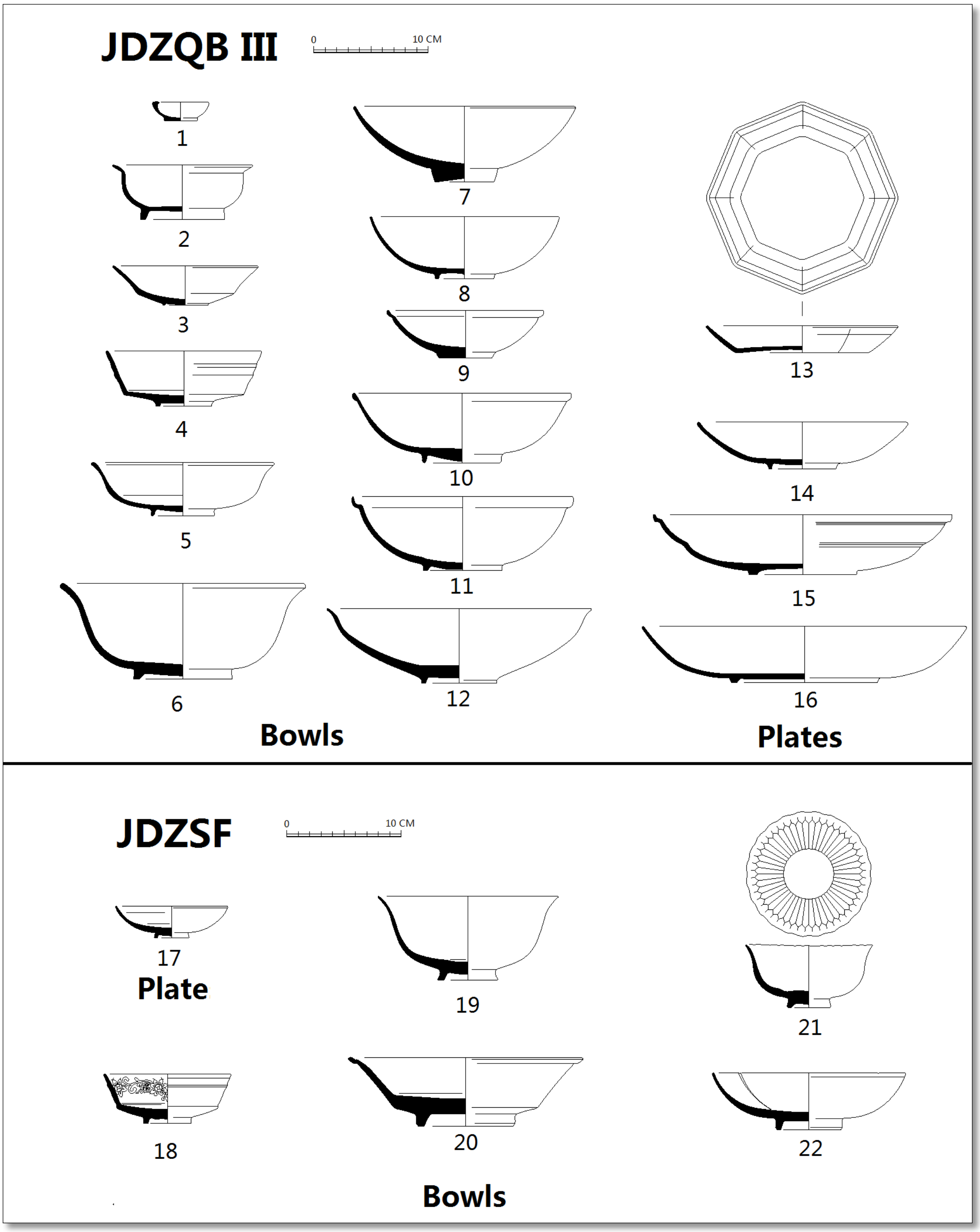
Drawing 7: Bowls, plates and cup of Longquan celadon imitations (LQC III Type and LQC IV Type).

1-5 and 7-12= Linjiang kilns, Jiangxi (Yu 1995:265-267) and 6, 13 and 14= Huiyang kilns, Guangdong (cf. Zeng 1962, 1964b).



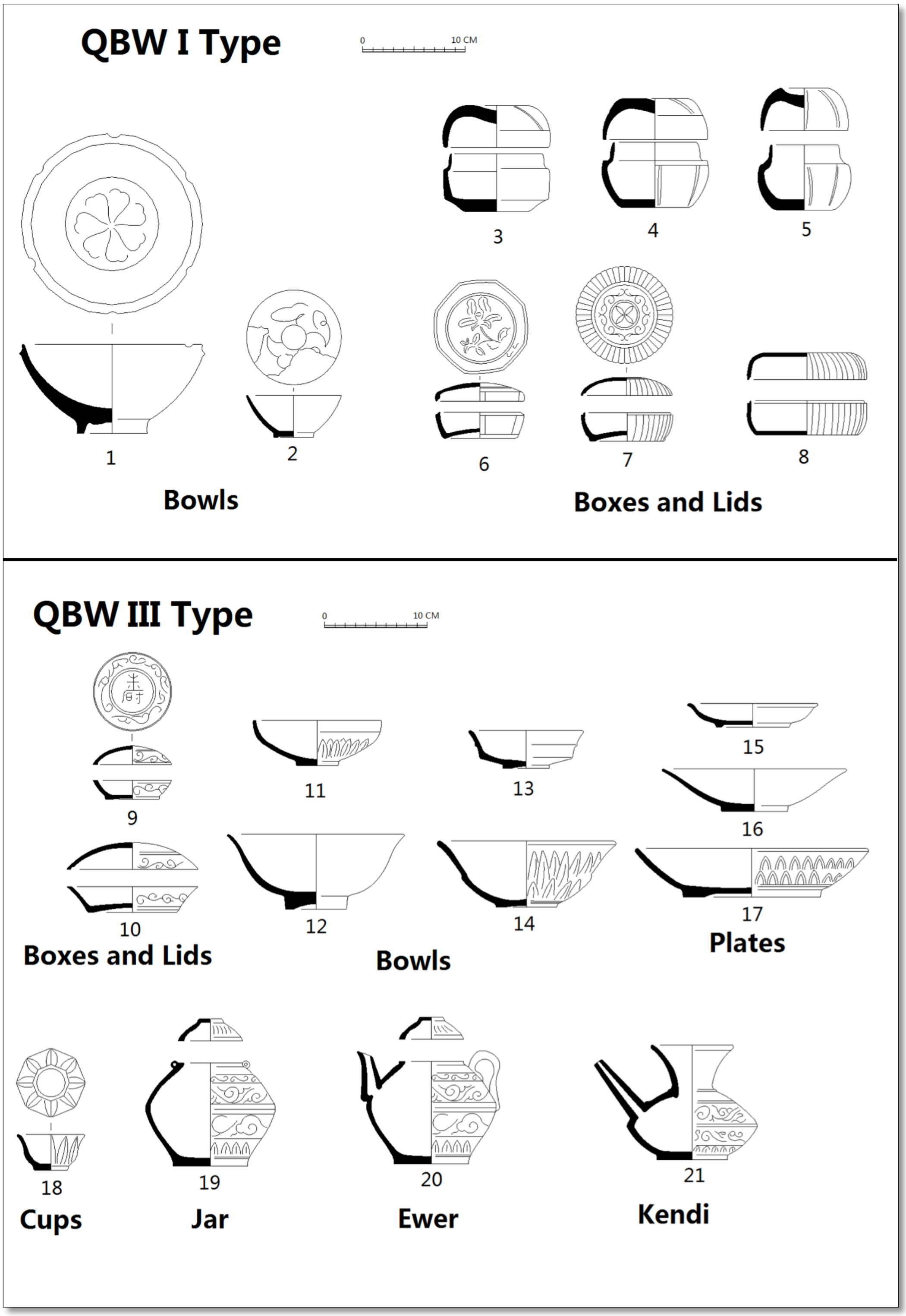
Drawing 8: Bowls, plates and boxes with lids of Jingdezhen Qingbai stonewares (JDZQB I and JDZQB II).

1-27=Hutian Kilns, Jingdezhen, Jiangxi (cf. JXSWWKGYJS and JDZMYBWG 2007)



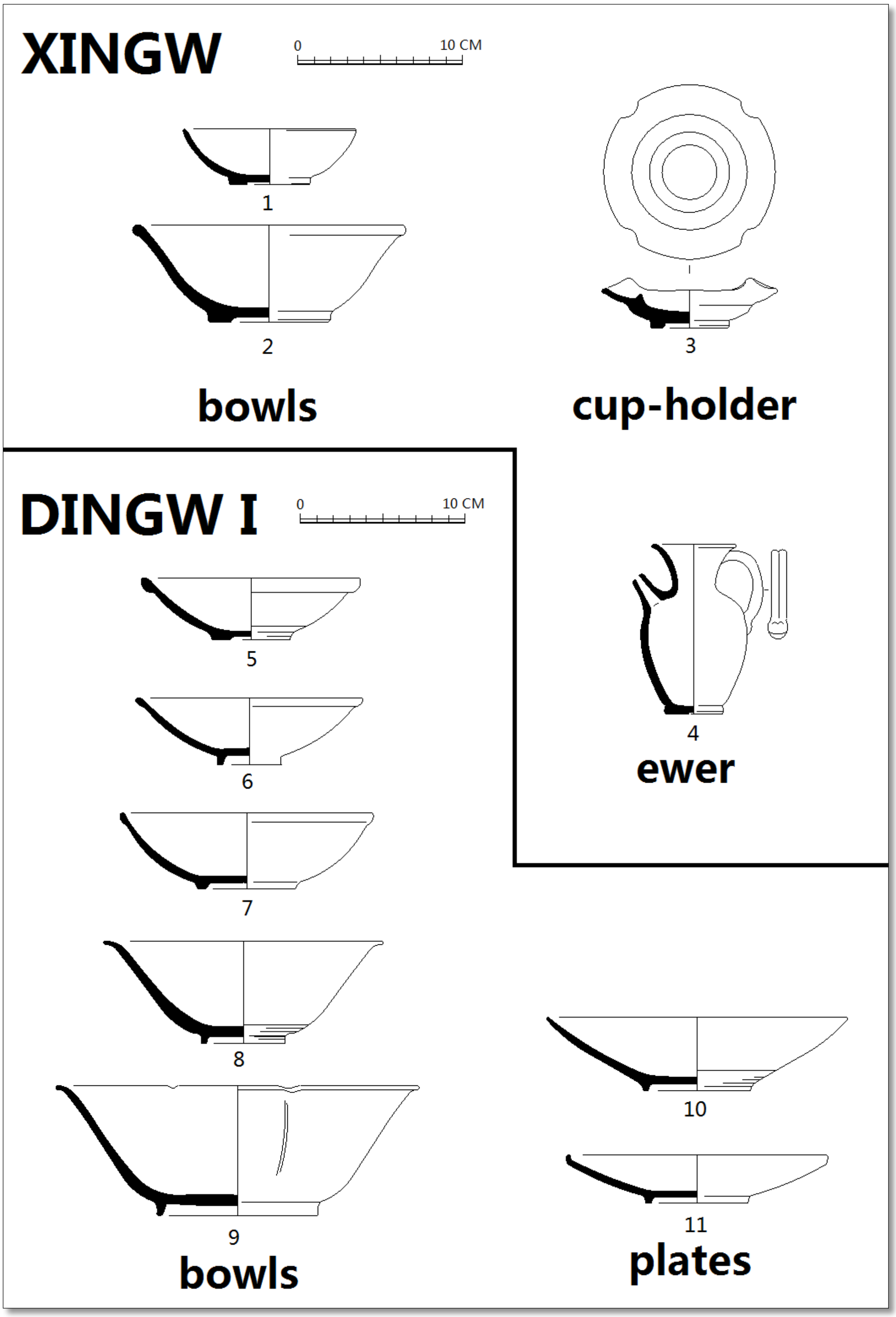
Drawing 9: Bowls and plates of Jingdezhen Qingbai stonewares and Shufu porcelain wares (JDZQB III and JDZSF).

1-22=Hutian Kilns, Jingdezhen, Jiangxi (cf. JXSWWKGYJS and JDZMYBWG 2007)



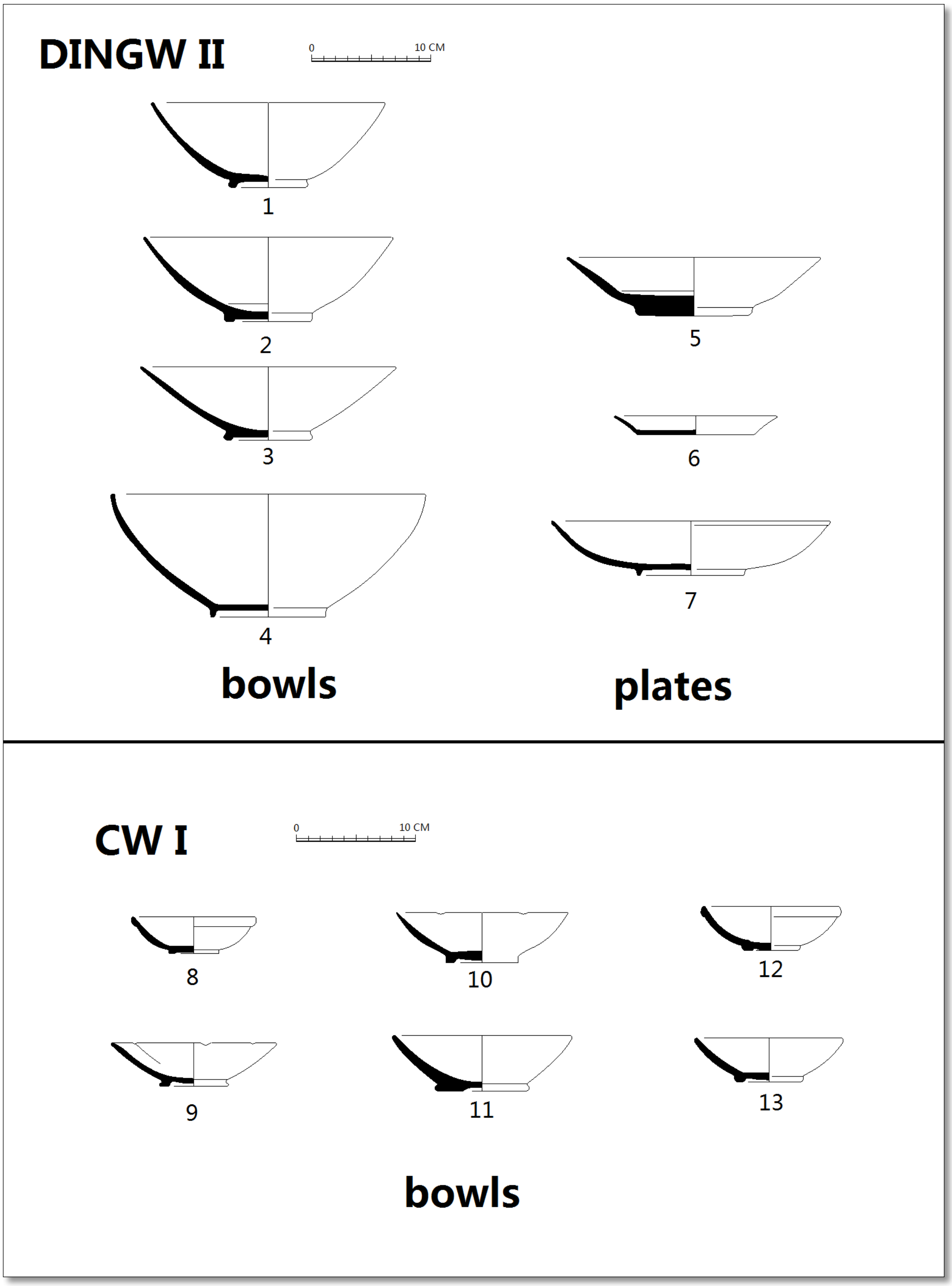
Drawing 10: Selected and principal shapes of Qingbai stonewares: (QBW I Type and QBW II Type).

1-2=Bijiashan Kilns, Guangdong(cf. GDSBWG 1981); 3-5=Nan'an kilns, Fujian (cf. FJSBWY et al. 2008, Liu 2013:77), 6-7=Wanpinglun kilns, Dehua, Fujian (cf. FJSBWG 1990a, Liu 2013:77), 8=Pucheng kilns, Fujian (Liu 2013:77, Lin and Zhao 1984) and 9-21=Qudougong kilns, Dehua, Fujian (cf. DHGCYKGFJGZD 1979).



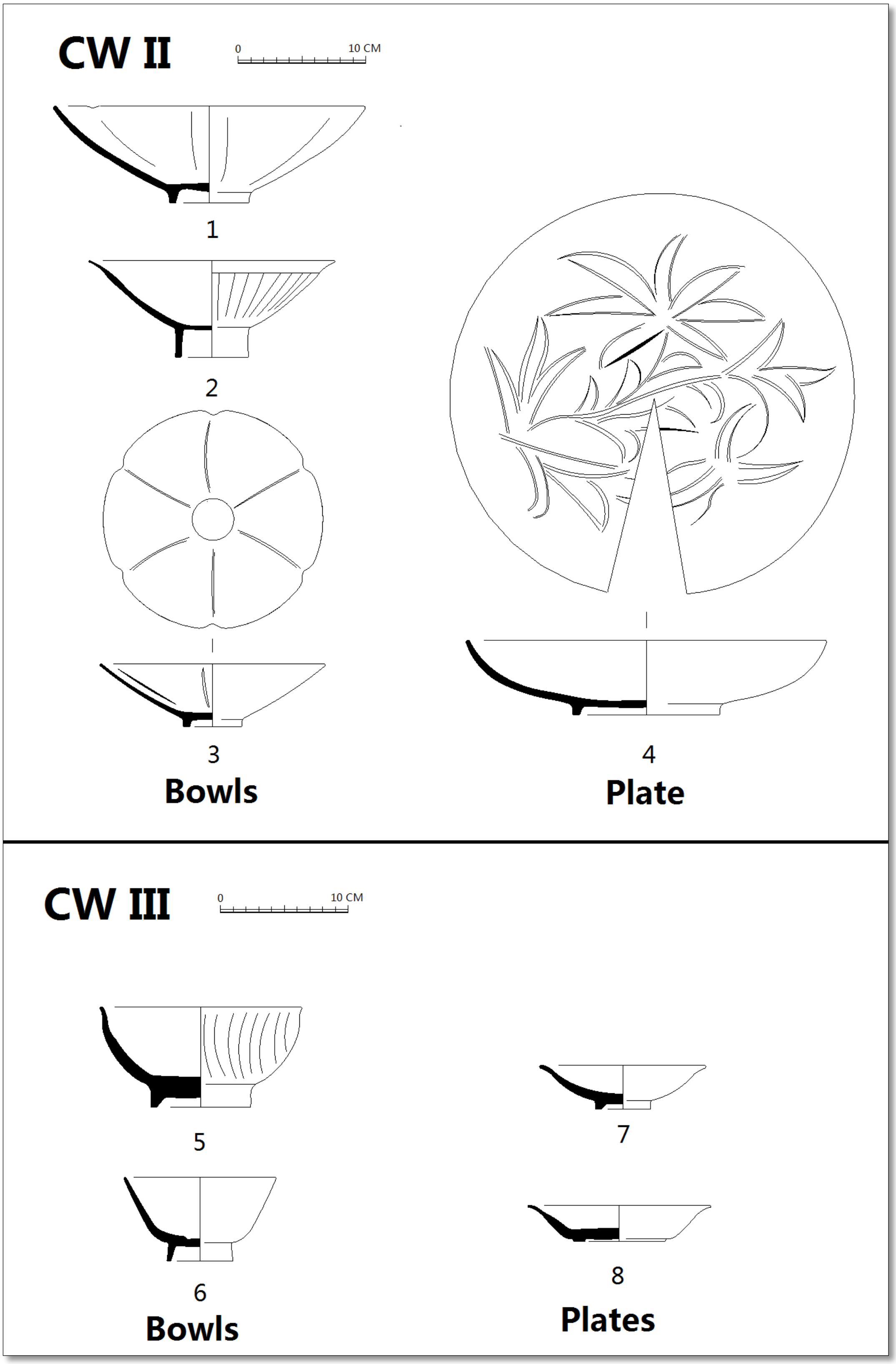
Drawing 11: Selected and principal shapes of early Xing and Ding white stonewares (XINGW and DINGW I).

1-4=Liu Fujun Tomb at Lincheng City, Hebei (Li et al. 1990:Figure 2); 5-11=Ding kilns at Quyang county, Hebei (cf. Lin 1965).



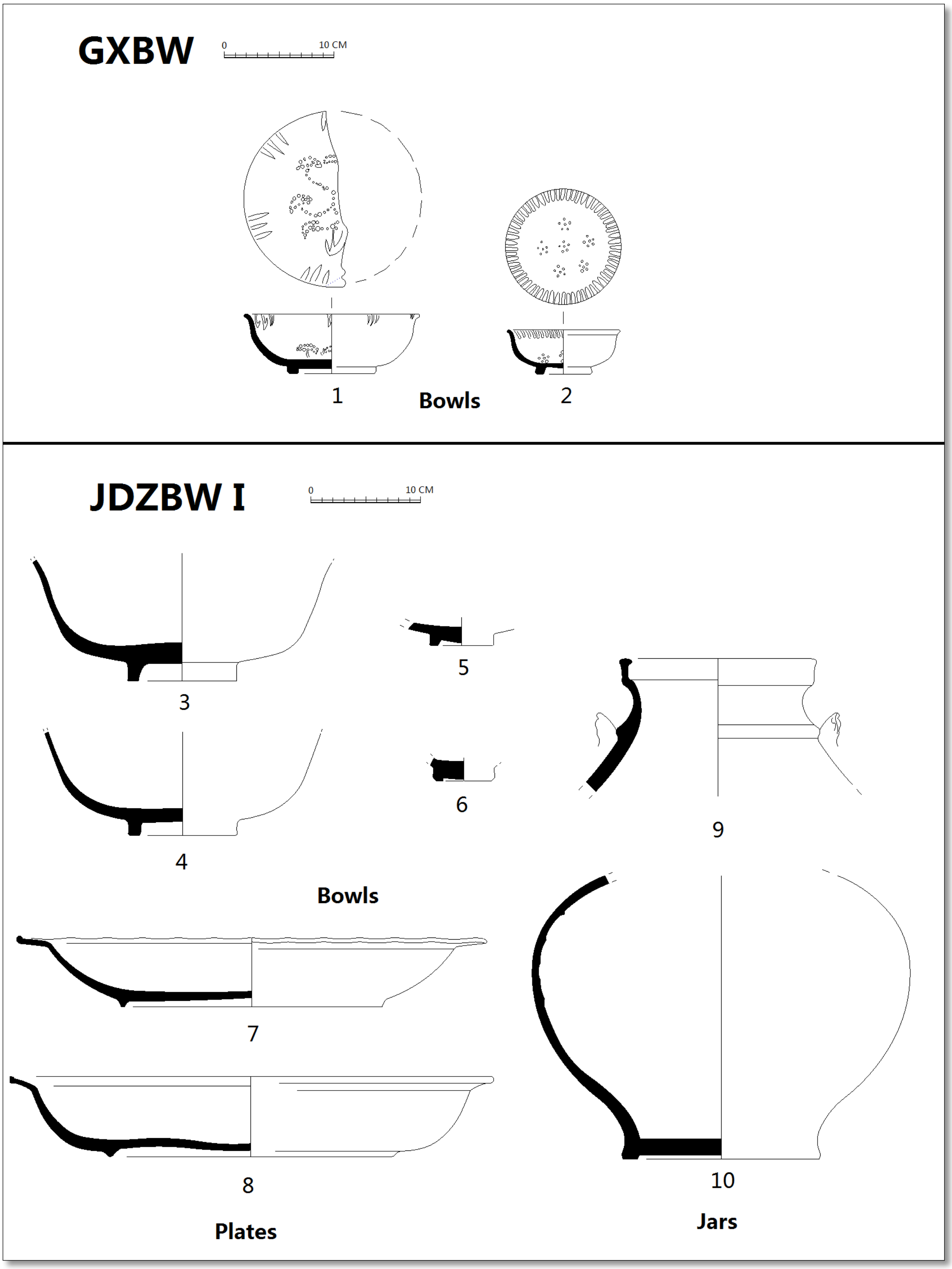
Drawing 12: Bowls and Plates of Ding white stonewares (DINGW II) and early corase white stonewares (CW I).

1-5= A Liao Tomb at Yemaotao Village, Faku County, Shenyang City, Liaoning Province (cf. Feng 1975); 6-7= Archaeological pit at Beizhen County, Baoding City, Hebei (Miao and Xue 1984:Figures 7 and 9); 8-11= A Tang Tomb at Beiyaowan Village, Gongyi City, Henan (Zhao et al. 1996:Figure 26) and 12-13= A Five Dynasties Tomb at Beiyaowan Village, Gongyi City, Henan (Zhao et al. 1996:Figure 32).



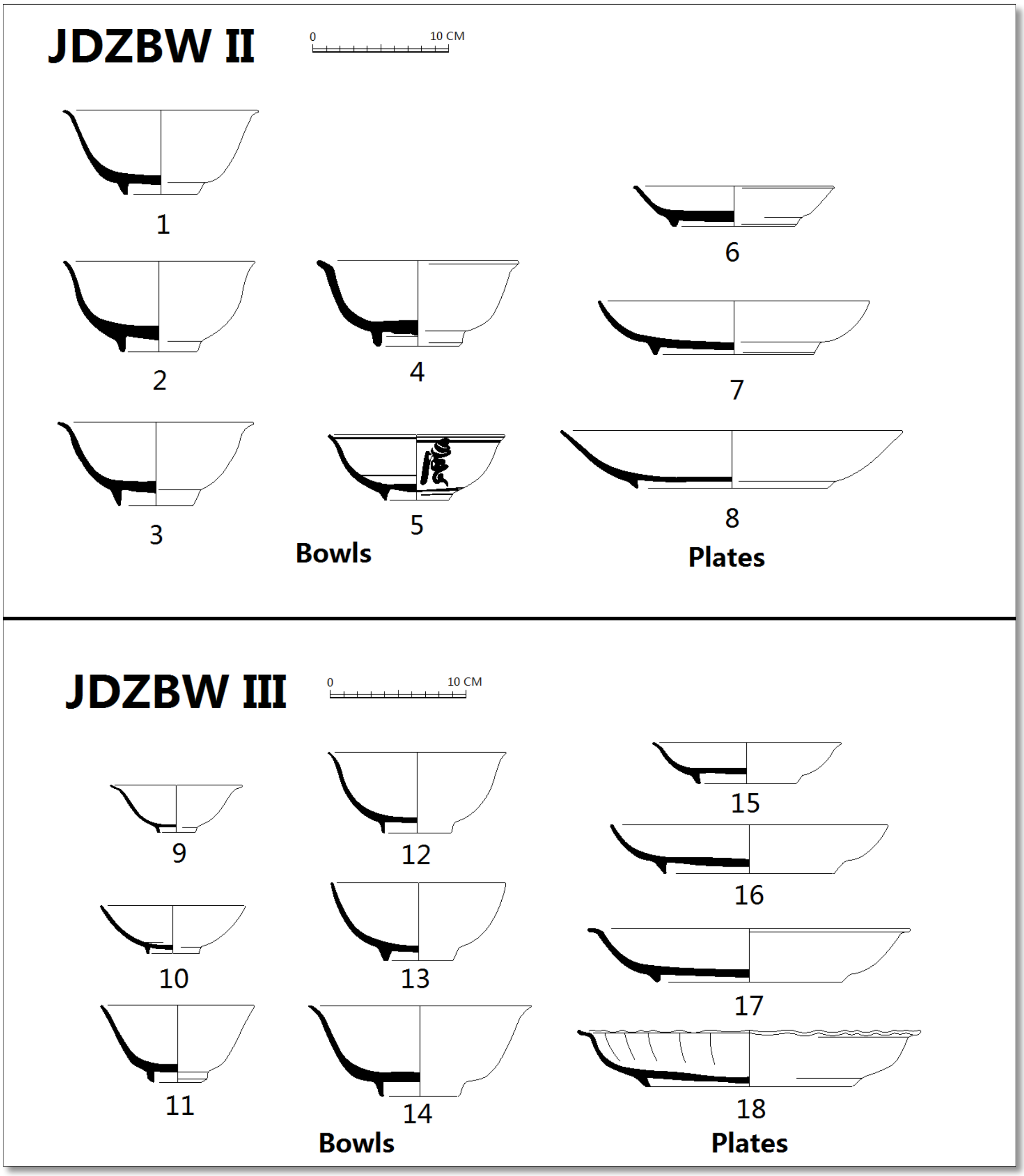
Drawing 13: Bowls and Plates of coarse white stonewares (CW II and CW III).

1-4=Cizhou Kilns, Hebei (cf. Qin and Ma 1990) and 5-8=Bijiashan Kilns, Guangdong (cf. GDSBWG 1981).



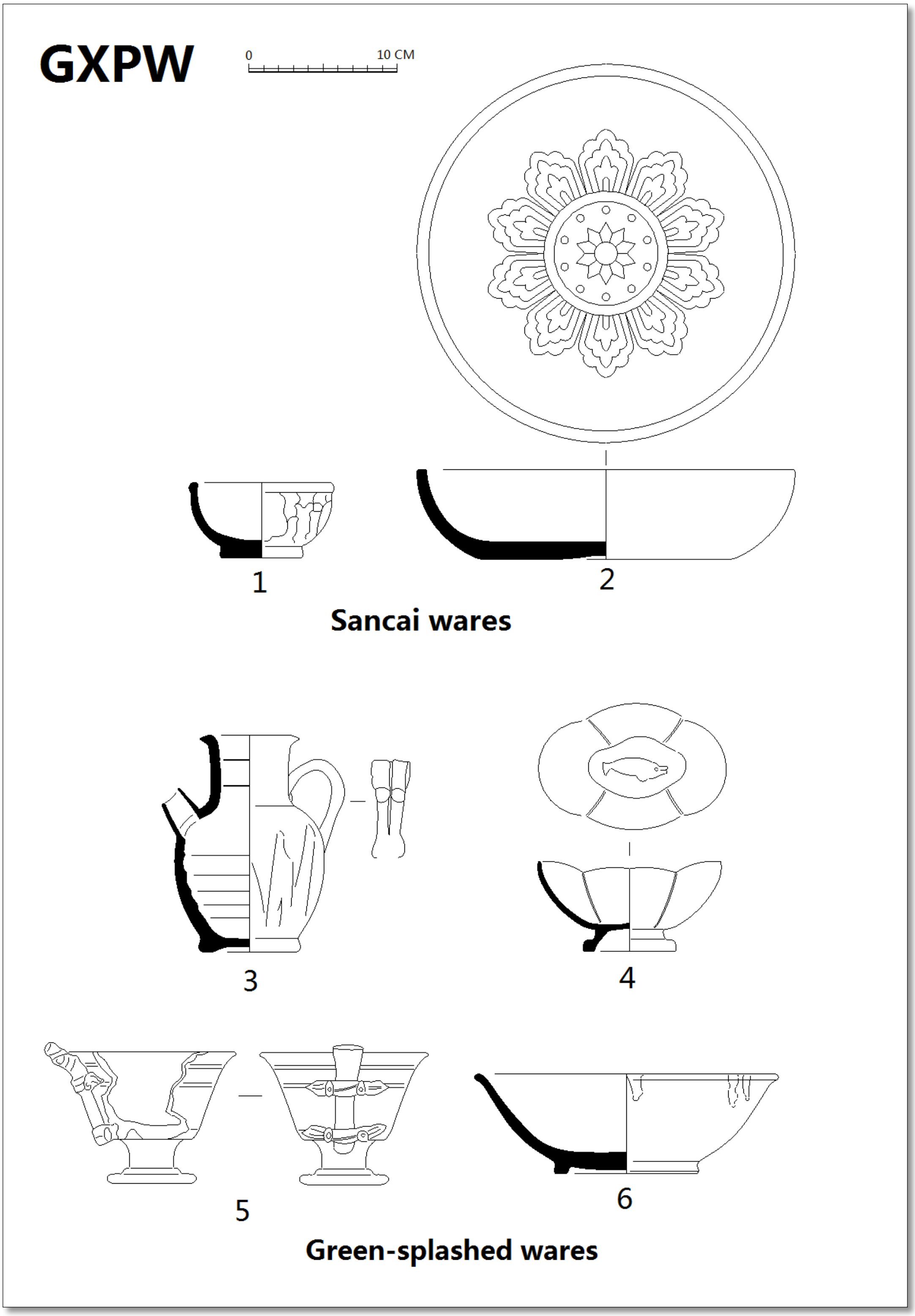
Drawing 14: Bowls, Plates and Jars of Jingdezhen blue and white porcelains (GXBW and JDZBW).

1-2=Huangye Kilns, Gongyi City, Henan (HNSWWKGYJS and ZGWWYJS 2007:Figure 13); 3, 4, 7-10=The Red Sea Wreck collections (cf. Carswell 2000:189-191) and 5-6=The Williamson Collections (sherd numbers +12744 V8A and +15729 AA1A).



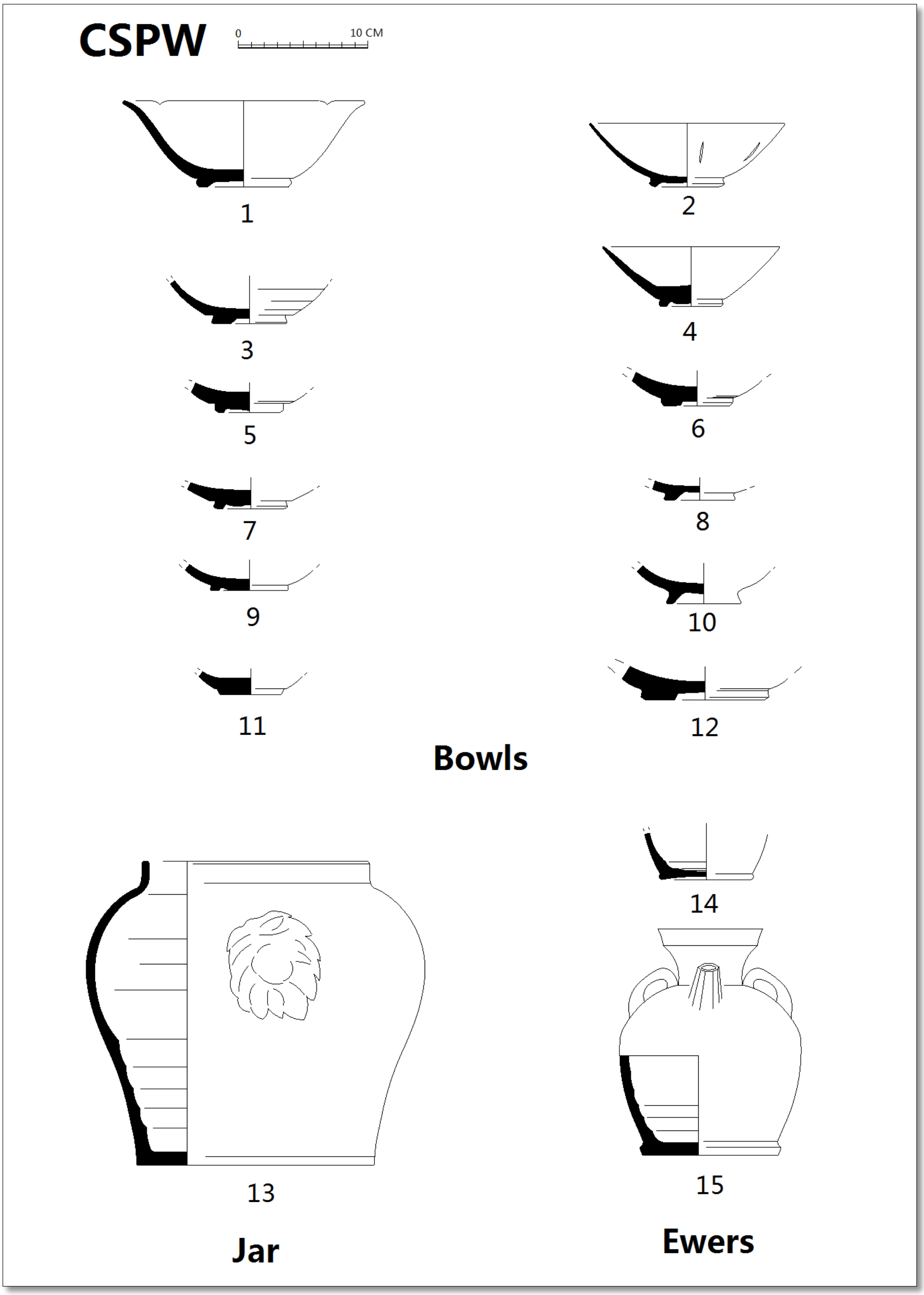
Drawing 15: Drawing 15: Bowls and Plates of Ming Jingdezhen blue and white porcelains (JDZBW II and JDZBW III).

1-8=Maojiawan Archaeological Sites, Beijing (cf. BJSWWYJS 2007) and 9-19=Hutian Kilns, Jingdezhen, Jiangxi (cf. JXSWWKGYJS and JDZMYBWG 2007).



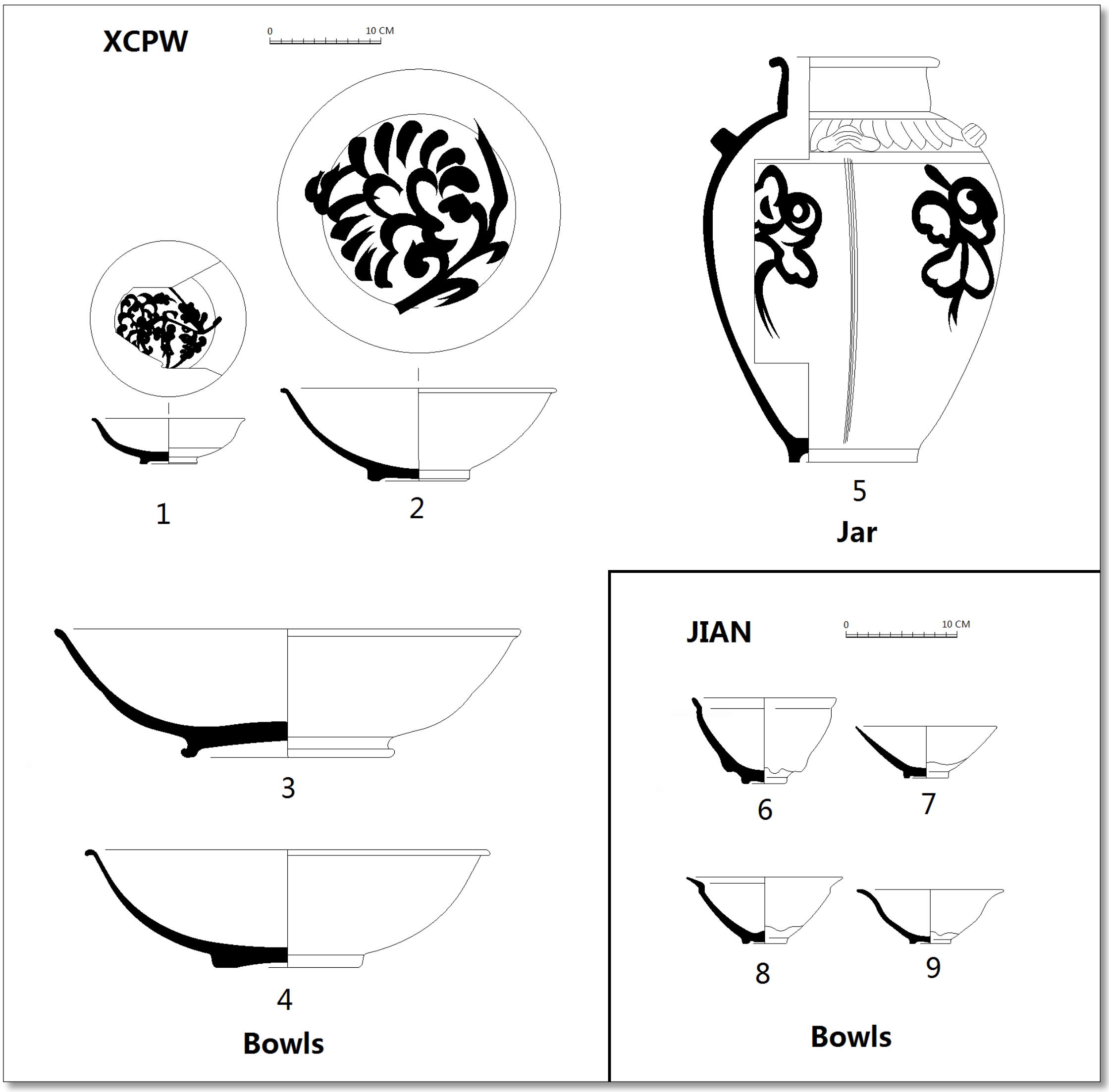
Drawing 16: Selected wares of Gongyi Polychrome wares (GXPW).

1-2=Baihe Kilns, Gongyi City, Henan (HNSWWKGYJS and ZGWHYCYJY 2011:Figures 24 and 26) and 3-6=Huangye Kilns, Gongyi City, Henan (HNSWWKGYJS and ZGWWYJS 2007:Figure 19 and 20).



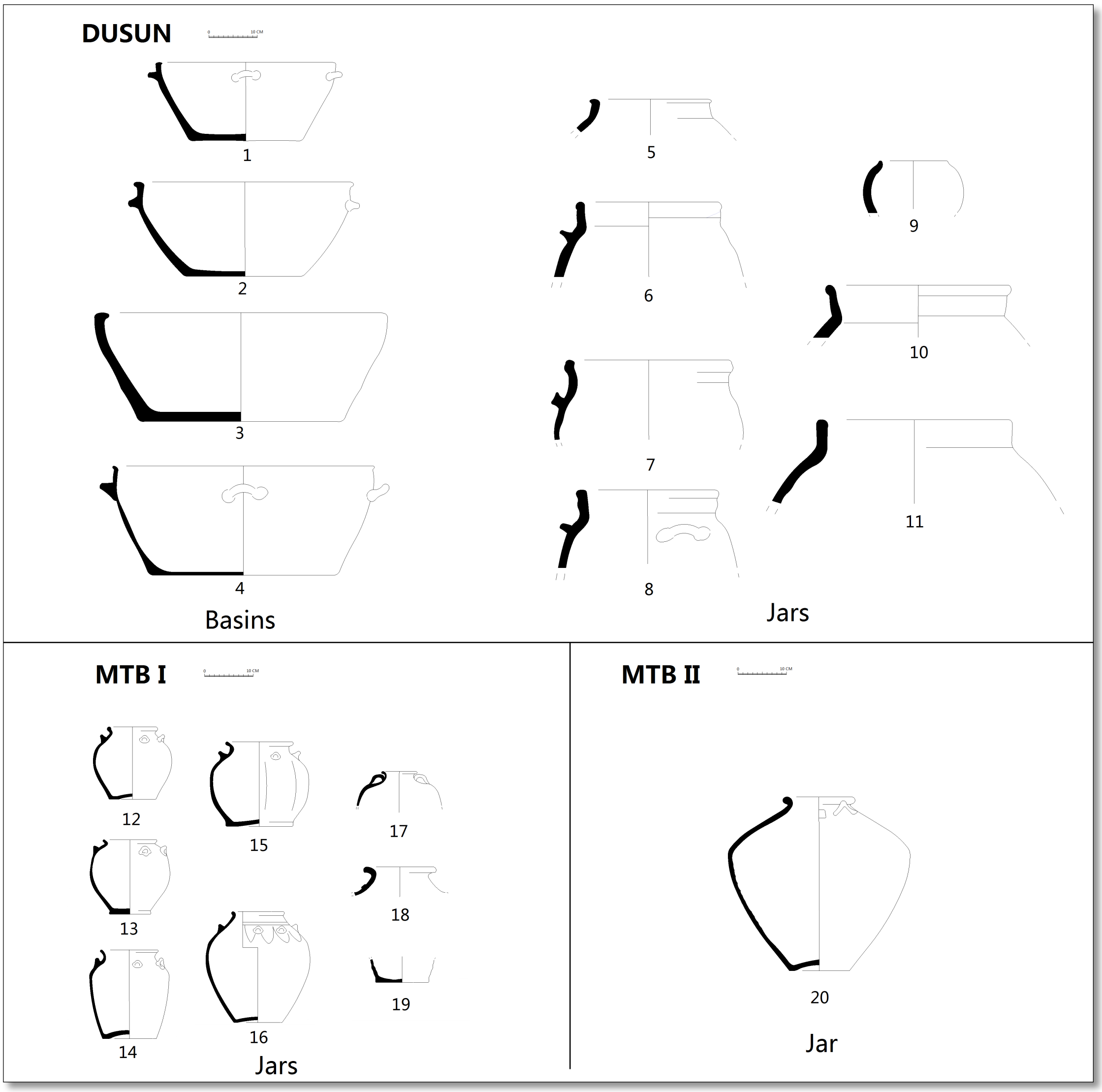
Drawing 17: Bowls, Jar and Ewers of Changsha polychrome wares (CSPW).

1, 2, 4, 13 and 15=Changsha Kiln Site, Changsha City, Hunan (cf. CSYKTZ 1996); 3, 4-12 and 14=Mantai site, Mantai, Sri Lanka (cf. Carswell et al. 2013)



Drawing 18: Bowls and Jar of Xicun polychrome wares (CSPW) and Jian black ware (JIAN).

1-5= Xicun Kiln Site, Guangdong (cf. GZSWWGLWYH and AMOCUH 1987) and 6-7= Jianyang Kiln Site, Fujian (cf. Li 1995a)

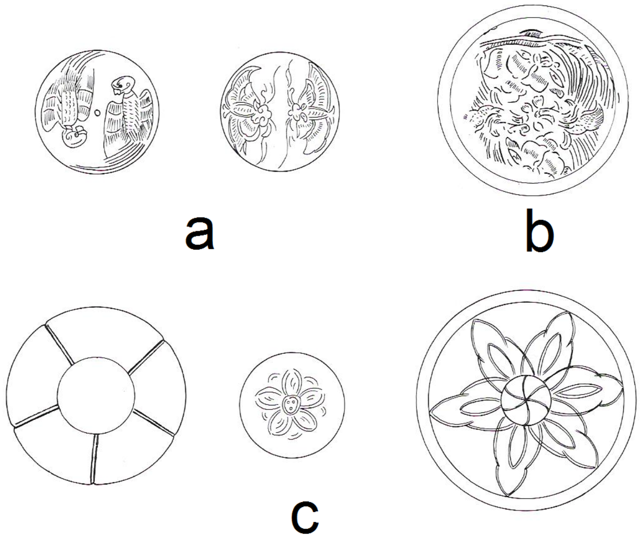


Drawing 19: Basins and Jars of Transport coarse wares (Dusun and MTB).

1-4= Guangchong Kiln Site, Guangdong (cf. Liu 2000), 5-11= Mantai site, Sri Lanka (cf. Carswell et al. 2013), 12-16= Xiaxiang Kiln Site, Qujiang, Guangdong (Wu and Da 2003:cf.), 17-19= Shanga, Kenya (Horton et al. 1996:304) and 20= Witte Leeuw Shipwreck, St. Helena, South Atlantic Ocean (Van Der Pijl-Ketel 1982:223).

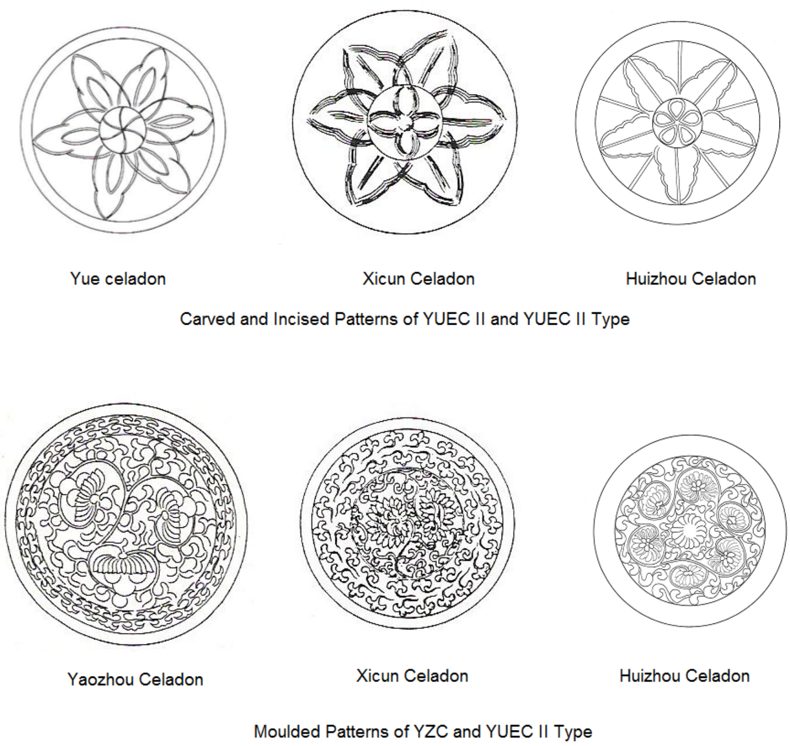
Appendix 7: Selected Patterns on Chinese Trade ceramics:

Drawings/Re-drawings by Ran Zhang



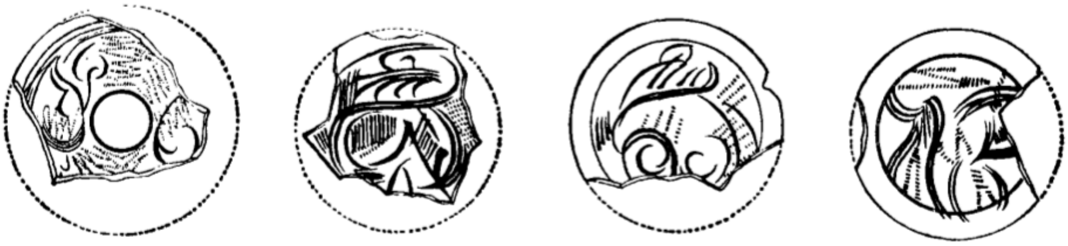
Pattern 1: Selected patterns of YUEC II.

(a=birds, butterflies; b=birds and flowers; c=floral patterns) (ZJSKWWKGYJS et al. 2002:366-fig 179)



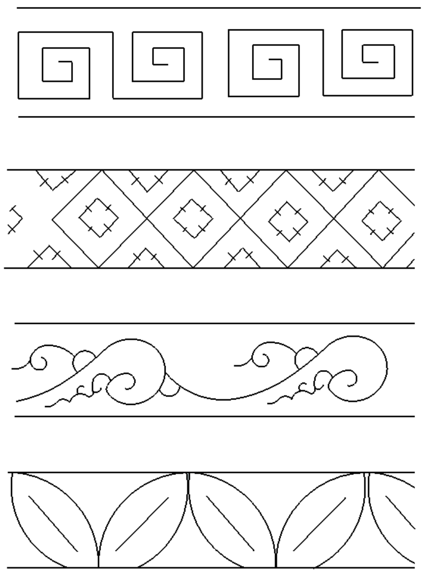
Pattern 2: Imitated decorations of YUEC II Type copied from Yue celadon and Yaozhou celadon wares.

(ZJSKWWKGYJS et al. 2002:366-fig 179, GZSWWGLWYH and AMOCUH 1987:36-fig 24-1; 45-fig 36-1, FPSM 1985:44, 47, SXSKGYJS and YZYBWG 1998:238 fig 121-4)

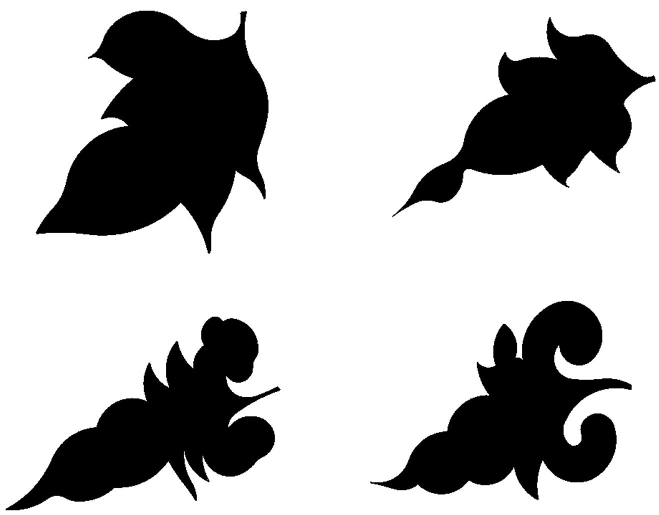


Pattern 3: Selected patterns of Tong'an ware.

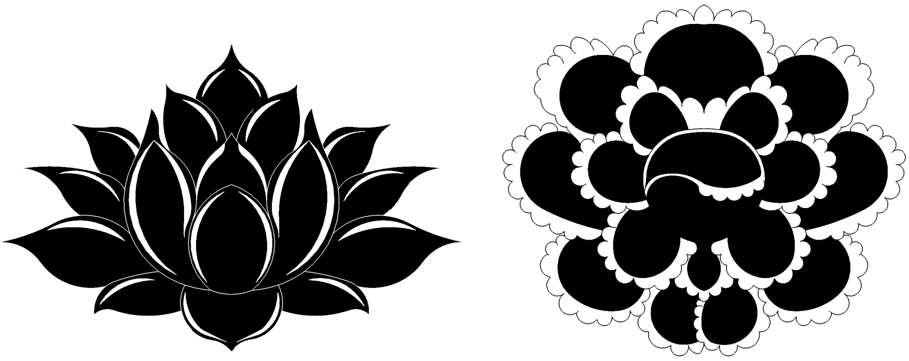
(Li 1974:81-fig 2-1,2,3,4)



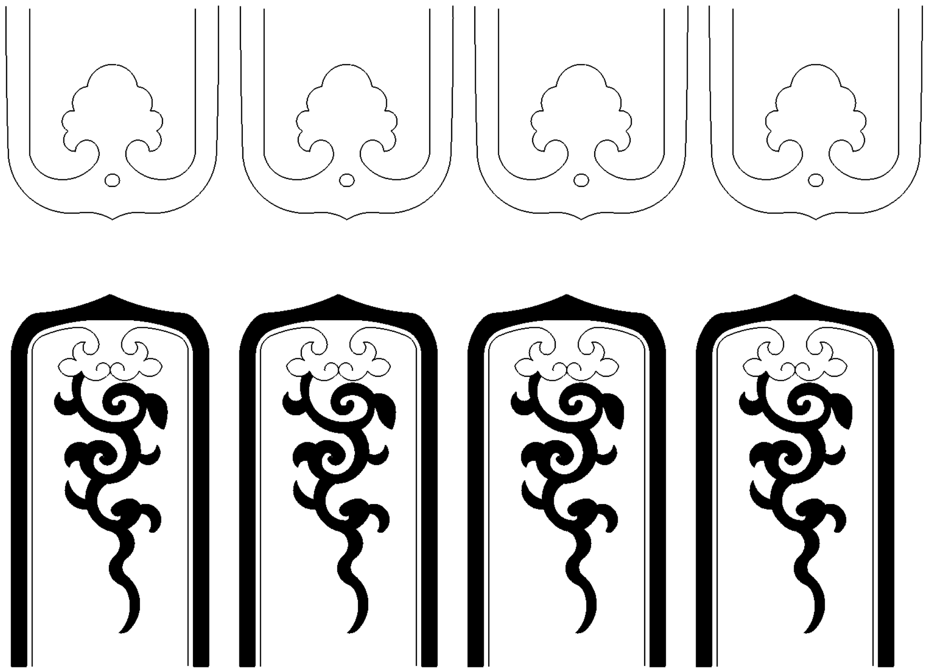
Pattern 4: Examples of band decoratings on Yuan blue and white porcelains.



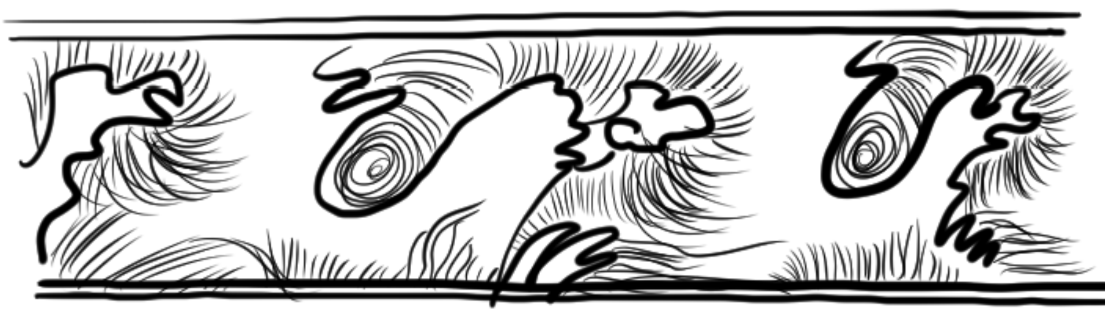
Pattern 5: Examples of gourd-shaped leaves on Yuan blue and white porcelains on Yuan blue and white porcelains.



Pattern 6: Examples of lotus and peony, which the petals have a white edge on Yuan blue and white porcelains.

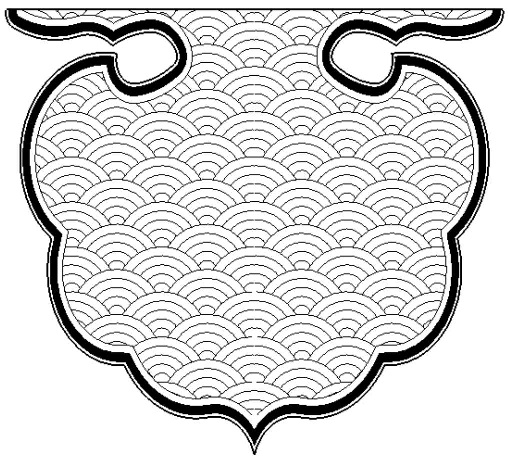


Pattern 7: Examples of decorating lotus petals on Yuan blue and white porcelains.



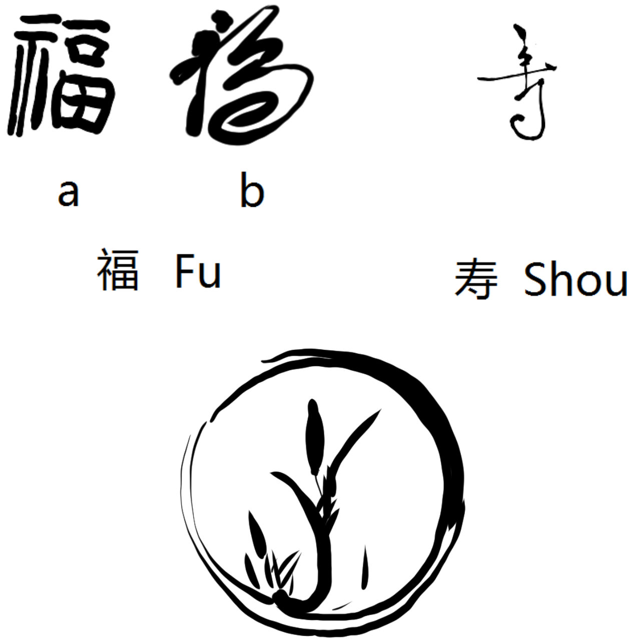
Pattern 8: An example of stylised water-wave pattern on Yuan blue and white porcelains.

Pattern 9: Examples of main motives on Yuan blue and white porcelains.

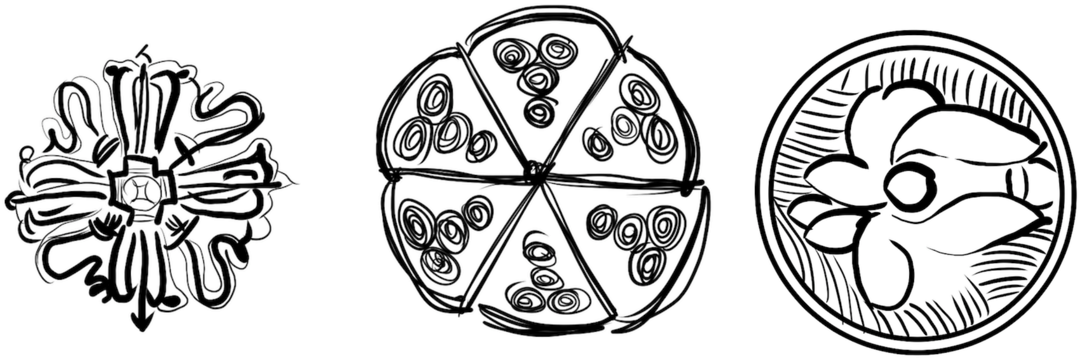


Pattern 10: An example of Ruyi-shaped Panel on Yuan blue and white porcelains.

Pattern 11: An example of stylised water-wave pattern on early Ming imperial-type blue and white porcelains.



Pattern 12: Examples of Chinese characters and motif on early Ming blue and white porcelain.



Pattern 13: Patterns of Buddist Vajra and Stylised Lotus patterns, decorated on the centre of inside of bowls or plates.

References:

ABU-LUGHOD, JANET L. 1989. *Before European hegemony: the world system AD 1250-1350*. Oxford University Press.

ADAMS, ROBERT. 1962. Agriculture and urban life in early southwestern Iran. *Science* 136: 109-122.

ADAMS, ROBERT. 1965. *Land behind Baghdad: a history of settlement on the Diyala Plains*. Chicago: Chicago University Press.

ADAMS, ROBERT. 1981. *Heartland of Cities: Surveys of Ancient Settlement and Land Use On the Central Floodplain at the Euphrates*. Chicago: Chicago University Press.

ADDIS, J. M. 1968. Chines Porcelain Found in the Philippines. *TOCS* 1967-1969: 17-36.

AKEMI, HORII. 2008. *INDIAN OCEAN TRADE AND THE ARABIAN GULF IN THE 14TH-17TH CENTURIES, A Study of Imported Ceramics from China and Southeast Asia Excavated at Julfar, UAE.* Unpublished M. Phil, University of Oxford.

AL-MUQADDASI. 1901. *Ahsan al-Taqasim fi ma'rifat al-aqalim, Arabic text in Goeje, III*. Calcutta.

AL-SIRAFI, ABU ZAYD HASAN. 1733. *Ancient Accounts of India and China by Two Mohammedan Travellers, Who Went to Those Parts in the 9th Century*. London: Sam. Hrading at the Bible and Anchor on the Pavement in St. Martins-Lane.

AN, JIAYAO. [安家瑶], 1990. 唐长安西明寺遗址发掘简报 Tang Chang'an Xi Ming Si Yizhi Fajue Jianbao. *Kaogu* 1: 45-55.

ANONYMOUS. 1962. *明实录 Veritable Records of the Ming, 中央研究院历史语言研究所校印本 Zhongyang YanjiuYuan Lishi Yuyan Yanjiusuo Jiaoyinben*. Taipei: Institute of History and Philology, Academia Sinica.

ANONYMOUS 1998. Yuan Dian Zhang 元典章. Beijing: Zhongguo Guanbo Dianshi Chubanshe.

ANONYMOUS. 2011. 仙游古瓷窑调查简报 Xianyou Gu Ciyao Diaocha Baogao, in Z. WU (ed.) *福建考古资料汇编 (1953-1959) Fujian Kaogu Ziliao Huibian (1953-1959)*: 22-25. Beijing: Kexue Chubanshe.

AOYAGI, Y & KANAZAWA, Y. 1980. Chinese Ceramics Discovered on the Coramandal Coast in India (in Japanese). *Trade Ceramic Studies* 8.

APPADURAI, ARJUN. 1986. *The social life of things: commodities in cultural perspective*. Cambridge University Press.

ARNOLD, LAUREN. 1999. *Princely Gifts and Papal Treasures: the Franciscan mission to China and its influence on the arts of the West*. Desiderata Press.

AUBIN, JEAN. 1953. Les Princes d'Ormuz du XlIIe au XVe siècle. *Journal Asiatique*: 77-137.

AUBIN, JEAN. 1963. Y at-il eu interruption du commerce par mer entre le Golfe Persique et l'Inde du XIe au XIVe siécle? *Studia* 11: 165-171.

AXXWHG. [安溪县文化馆], 1977. 福建安溪古窑址调查 Fujian Anxi Guyaozhi Diaocha. *Wenwu* 7: 58-65.

BAI, SHOUYI. [白寿彝], 1997. *中国通史 Zhongguo Tongshi*. Shanghai: Shanghai Renmin Chubanshe.

BARTOL'D, VASILIĬ VLADIMIROVICH & BOSWORTH, CLIFFORD EDMUND. 1988. *Turkestan down to the Mongol Invasion*. Oxford: The E.J.W. Gibb Memorial Trust.

BATTUTA, IBN. 1929. *The Travels of Ibn Battuta AD 1325-1354* Translated by H.A.R. GIBB. Cambridge: Cambridge University Press.

BEDDOE, STELLA. 2008. Chinese Whispers: How the Arrival of Chinese Porcelain Inspired English Ceramic Fantasies of China c1700-1800. *TOCS*: 51-55.

BJDXKGWBXY & HNSWWKGYJS. [北京大学中国考古学研究中心 & 河南省文物考古研究所], 2005. 河南省禹州市神垕镇下白峪窑址发掘简报 Henansheng Yuzhoushi Shenhouzhen Xiabaiyu Yaozhi Fajue Jianbao. *Wenwu* 5: 15-36.

BJDXKGWBXY, JXSWWKGYJS & JDZSTCKGYJS. [北京大学考古文博学院, 江

西省文物考古研究所 & 景德镇市陶瓷考古研究所], 2007. 江西景德镇明清御窑遗址发掘简报 Jiangxi Jingdezhen Ming Qing Yuyao Yizhi Fajue Baogao. *Wenwu* Vol 5: 4-47.

BJDXKGWBXY, JXSWWKGYJS & JDZSTCKGYJS. [北京大学考古文博学院, 江西省文物考古研究所 & 景德镇市陶瓷考古研究所], 2009. *景德镇出土明代御窑瓷器 Jingdezhen Chutu Mingdai Yuyao Ciqi*. Beijing: Wenwu Chubanshe.

BJSWWGLC. [北京市文物管理处], 1972. 近年来北京发现的几座辽墓 Jinnianlai Beijing Faxian De Jizuo Liaomu. *Kaogu* 3: 35-40.

BJSWWGLC. [北京市文物管理处], 1977. 北京先农坛金墓 Beijing Xiannongtan Jinmu. *Wenwu* 11: 91-92, 04.

BJSWWYJS. [北京市文物研究所], 1986. 元铁可父子墓和张弘纲墓 Yuan Tieke Fuzi He Zhang Honggang Mu. *Kaogu Xuebao* 1: 95-114.

BJSWWYJS. [北京市文物研究所], 2007. *毛家湾明代瓷器坑考古发掘报告 Maojiawan Mingdai Ciqi Keng Kaogu Fajue Baogao*. Beijing: Kexue Chubanshe.

BJYSBWG. [北京市艺术博物馆], 2011. *中国巩义窑 Gongyi Kiln of China*. Beijing: Zhongguo Huaqiao Chubanshe.

BOYLE, JOHN ANDREW. 1968. *The Cambridge History of Iran: The Saljuq and Mongol Period*. Cambridge: Cambridge University Press.

BRONSON, BENNET. 1996. Chinese and Middle Eastern Trade in Southern Thailand During the 9th Century A.D., in A. SRISUCHAT (ed.) *Ancient Trades and Cultural Contacts in Southeast Asia*: 181-200. Bangkok, Thailand: Srimuang Printing Co. Ltd.

BROWN, ROXANNA M. 2009. *The Ming Gap and Shipwreck Ceramics in Southeast Asia: Towards a Chronology of Thai Trade Ware*. Bangkok: Siam Society.

CAHEN, C. 1970. Le commerce musulman dans l'Océan Indien au Moyen Age. *Sociétés et Compagnies de commerce en Orient et dans l'Océan Indien*: 180-193.

CANEPA, TERESA. 2010. The Portuguese and Spanish Trade in Kraak Porcelain in the

Late 16th and Early 17th Centuries. *Transactions of the Oriental Ceramic Society*: 61.

CAO, CHUNRONG. [曹春荣], 1984. 瑞金县逕桥宋青瓷窑址调查记 Ruijinxian Jingqiao Song QIngci Yaozhi Diaocha Ji. *南方文物 Nanfang Wenwu* 2: 64-65.

CARSWELL, JOHN. 1977. China and Islam in the Maldive Islands. *Transactions of the Oriental Ceramic Society* 41: 121-198.

CARSWELL, JOHN. 1978. Excavation at Vankalai, Sri Lanka. *Research Reports-National Geographic Society* 19: 129.

CARSWELL, JOHN. 1985. Sri Lanka and China, in AMERASINGHE (ed.) *festschrift 1985-James Thevathasan Rutnam*: 57-60. Colombo.

CARSWELL, JOHN. 1996. The Excavation of Mantai. *The Indian Ocean in Antiquity*.

CARSWELL, JOHN. 2000. *Blue & White: Chinese porcelain around the world*. British Museum Press.

CARSWELL, JOHN, DERANIYAGALA, SIRAN & GRAHAM, ALAN. 2013. *Mantai: City By the Sea*. Aichwald, Germany: Linden Soft.

CARTER, R. A. 2005. The Pottery, in T. INSOLL (ed.) *The Land of Enki in the Islamic Era: Pearls, Palms, and Religious Identity in Bahrain*: 108-192, 401-451. London: Routledge.

CHANDIMA, A. 2006. 斯里兰卡藏中国古代文物研究—兼谈古代中斯贸易关系 A Critical Examination of Ancient Economic Relationships between China and Sri Lanka based on Sri Lankan Arttifacts. Unpublished Archaeological Department of Shandong University, A Doctral Dissertation

CHAO, ZHONGCHEN. [晁中辰], 2012. *明代海外贸易研究 Mingdai Haiwai Maoyi Yanjiu*. Beijing: Gugong Chubanshe Press.

CHAUDHURI, KIRTI N. 1985. *Trade and Civilization in the Indian Ocean: an Economic History from the Rise of Islam to 1750*. Cambridge: Cambridge University Press.

CHEN, BAIQUAN. [陈柏泉], 1963. 江西临川南丰窑址調查 Jiangxi Linchuan Nanfeng Yaozhi Diaocha. *Kaogu*: 686-689.

CHEN, BAIQUAN. [陈柏泉], 1973a. 江西横峰、弋阳窑址调查 Jiangxi Hengfeng, Yiyang Yaozhi Diaocha. *Wenwu* 2: 63-64.

CHEN, DINGRONG. [陈定荣], 1986. 江西靖安，奉新的古瓷窑 Jiangxi Jing'an, Fengxing De Guciyao. *Kaogu* 4: 379-382.

CHEN, DINGRONG. [陈定荣], 1990. 论赣州七里镇古瓷窑 Lun Ganzhou Qilizhen Guciyao, in ZGGTCYJH (ed.) *中国古陶瓷研究 Zhongguo Gutaoci Yanjiu* Beijing: Zijincheng Chubanshe.

CHEN, GAOHUA. [陈高华], 1981. *宋元时期的海外贸易 Song Yuan Shiqi De Haiwai Maoyi*. Tianjin: Tianjin Renmin Chubanshe Press.

CHEN, JIANZHONG. 1999. *德化民窑青花 Dehua Minyao Qinghua "Common Blue and white of Dehua Kilns"*. Wenwu Press.

CHEN, KELUN. [陈克伦], 2012. A Sixty Year's Study of Yuan Dynasty Blue-and-White, in S. MUSEUM (ed.) *Splendos in Smalt 幽蓝神采*: 12-29. Shanghai: Shanghai Museum.

CHEN, MINGZHONG. [陈明忠], 2013. 福建政和县发现东汉晚期至三国时期窑址 Fujian Zhenghe Xian Faxian Donghan Wanqi Zhi Sanguo Shiqi Yaozhi. *南方文物 Nanfang Wenwu*: 31-35.

CHEN, NING. [陈宁], 2009. 六十年来中国古陶瓷文献学研究评述 A Review of Reserches on Chinese Ancient Ceramic Documentation Science over the Past 60 Years. *China Ceramics 中国陶瓷* 12: 93-97.

CHEN, PENG, HUANG, TIANZHU & HUANG, BAOLING. [陈鹏, 黄天柱 & 黄宝玲], 1982. 福建晋江磁灶古窑址 Fujian Jinjiang Cizao Yao Guyao Zhi. *Kaogu* 5: 490-498.

CHEN, QIANBAI. [陈柏泉], 1973b. 江西乐平明代青花窑址调查 Jiangxi Leping Mingdai QInghua Yaozhi Diaocha. *Wenwu* 3: 46-48.

CHEN, XIAOBO. [陈小波], 1984. 广西桂平古窑址调查 Guangxi Guiping Guyaozhi Diaocha, in W.B.S. 文物编辑委员会 (ed.) *中国古代窑址调查发掘报告集 Zhongguo Gudai Yaozhi Diaocha Fajue Baogao Ji*: 195-200. Beijing: Wenwu Chubanshe.

CHEN, YUANFU & YI, SHITONG. [陈元甫 & 伊世同], 1979. 浙江临安晚唐钱宽墓出土天文图及“官”字款白瓷 Zhejiang Lin'an Wantang Qiankuan Mu Chutu Tianwentu Ji 'Guan' Zikuan Baici. *Wenwu* 12: 18-23.

CHEN, ZHILIANG. [陈智亮], 1978. 广东石湾古窑址调查 Guangdong Shiwan Gu Yaozhi Diaocha. *Kaogu* 3: 195-199.

CHEN, ZILONG. [陈子龙], 1962. *明经世文编 Ming Jing Shi Wen Bian*. Beijing: Zhonghua Shuju.

CHENG, JIANPING. [程建平], 2004. 元代釉里红基本特征 Yuandai Youlihong Jiben Tezheng. *景德镇陶瓷 Jingdezhen Taoci* 14: 43-44.

CHENG, LIXIAN, LIU, LIN & YU, JIADONG. [程立宪, 刘林 & 余家栋], 1984. 江西丰城罗湖窑发掘简报 Jiangxi Fengcheng Luohu Yao Fajue Jianbao, in W.W.B.J.W.Y.H. 文物编辑委员会 (ed.) *中国古代窑址调查发掘报告集 Zhongguo Gudai Yaozhi Diaocha Fajue Baogao Ji*: 73-93. Beijing: Wenwu Chubanshe.

CHI, DACHENG. [池达程], 1984. 会昌县林岗坝唐代窑址 Huichangxian Lingangba Tangdai Yaozhi. *南方文物 Nanfang Wenwu* 2: 56-59.

CHILDE, V. GORDON. 1956. *Piecing Together the Past: The Interpretation of Archaeological Data*. London: Routledge & Kegan Paul.

CHITTICK, NEVILLE. 1967. Discoveries in the Lamu archipelago. *AZANIA: Journal of the British Institute in Eastern Africa* 2: 37-67.

CHITTICK, NEVILLE. 1984. *Manda: excavations at an island port on the Kenya coast*. British Institute in Eastern Africa Nairobi.

CHITTICK, NEVILLE & WHEELER, MORTIMER. 1974. Kilwa: an Islamic trading city on the East African coast.

CHRISTENSEN, A. P. 1993. *mperial investment and agricultural development in Parthian and Sasanian KhuzestanThe Decline of Iranshahr. Irrigation and Environment in the History of the Middle East 500 BC to AD 1500*. Copenhagen: Museum Tusculanum Press.

CLUNAS, CRAIG & HARRISON-HALL, JESSICA. 2014. *The BP Exhibition: Ming: 50 Years that Changed China*. British Museum.

CONINGHAM, ROBIN, ALLCHIN, FR, BATT, C, CHEETHAM, P & HAGGERTY, R. 1999. *Anuradhapura The British-Sri Lankan Excavations at Anuradhapura Salgaha Watta 2, Volume I: The Site, BAR International Series*. Oxford: Archaeopress.

CONINGHAM, ROBIN, ALLCHIN, FR, BATT, C, CHEETHAM, P & HAGGERTY, R. 2006. *Anuradhapura The British-Sri Lankan Excavations at Anuradhapura Salgaha Watta 2, Volume II: The Artefacts, BAR International Series*. Oxford: Archaeopress.

CQSBWG. [重庆市博物馆], 1984. 四川广元瓷窑的调查收获 Sichuan Guangyuan Ciyao De Diaocha Shouhuo. *四川古陶瓷研究 Sichuan Gu Taoci Yanjiu* 1.

CQSBWG. [重庆市博物馆], 1991. 四川重庆涂山锯木湾宋代瓷窑发掘简报 Sichuan Chongqing Tushan Jumuwan Songdai Ciyao Fajue Jianbao. *Kaogu* 3: 227-232.

CRICK, MONIQUE. 2010. Chinese Trade Ceramics for South-East Ásia: Collection of Ambassador and Mrs Charles Muller. *Italy: Edições Fondation Baur*.

CSYBJWYH. [长沙窑编辑委员会], 2004. *长沙窑：研究资料 Changsha Yao: Yanjiu Ziliao*. Hunan: Hunan Meishu Chubanshe.

CSYKTZ. [长沙窑课题组], 1996. *长沙窑 Changsha Yao*. Beijing: Forbidden City Press.

CXSBWG. [慈溪市博物馆], 2002. *上林湖越窑 Shanglinhu Yue Yao*. Beijing: Kexue Chubanshe.

DE CARDI, BEATRICE. 1978. *Qatar archaeological report: excavations 1973*. Oxford University Press.

DE CARDI, BEATRICE, VITA-FINZI, CLAUDIO & COLES, ANNE. 1975. Archaeological survey in northern Oman, 1972. *East and West*: 9-75.

DEBLASI, ANTHONY. 2001. Striving for Completeness: Quan Deyu and the Evolution of the Tang Intellectual Mainstream. *Harvard Journal of Asiatic Studies* 61: 5-36.

DELGADO, J. P. 1998. *Encyclopedia of Underwater and Maritime Archaeology*. Yale: Yale University Press.

DENG, GANG. 1997. *Chinese Maritime Activities and Socioeconomic Development: C.*

2100 BC-1900 AD. series 188). Greenwood Publishing Group.

DENG, GANG. 1999. *Maritime Sector, Institutions and Sea Power of Premodern China*. Greenwood Publishing Group.

DENG, GANG. 2002. *The premodern Chinese economy: structural equilibrium and capitalist sterility*. Routledge.

DENG, JIECHANG. [邓杰昌], 1989. 海康古代赭彩瓷器初探 Haikang Gudai Zhecai Ciqi Chutan. *海康文史 Haikang Wenshi* 2.

DENG, LAN. [邓兰], 2003. 北海古窑址(群)初探 Beihai Gu Yaozhi (Qun) Chutan. *广西社会科学 Guangxi Social Sciences* 6: 165-166.

DHGCYKGFJGZD. [德化古陶瓷考古福建工作队], 1979. 福建德化屈斗宫窑址发掘简报 Fujian Dehua Qudougong Yizhi Fajue Baogao. *Wenwu* 5: 51-61.

DICKINSON, RW. 1975. The archaeology of the Sofala Coast. *The South African Archaeological Bulletin*: 84-104.

DREYER, EDWARD L & STEARNS, PETER. 2005. *Zheng He: China and the Oceans in the Early Ming Dynasty 1405-1433*. New York: Pearson Longman.

DU, ZHENGXIAN. [杜正贤], 2002. 杭州老虎洞南宋官窑窑址的考古学研究 Hangzhou Laohudong Nansong Guanyao Yaozhi De Kaogu Xue Yanjiu. *故宫博物院院刊 Gugong Bowuyuan Yuankan*: 1-7.

DXBWG. [定县博物馆], 1978. 河北定县发现两座宋代塔基 Hebei Dingxian Faxian Liangzuo Songdai Taji. *Wenwu* 8: 39-48.

EZSBWG. [鄂州市博物馆], 1995. 湖北鄂州市五处古窑址的调查 Hubei E'zhoushi Wuchu Guyaozhi De Diaocha. *江汉考古 Jianghan Kaogu* 2: 30-35.

FANG, LILI. [方李莉], 2013. *中国陶瓷史 Zhongguo Taoci Shi*. Ji'nan: 齐鲁书社 Qilu Shuche Press.

FENG, XIANMING. [冯先铭], 1959. 河北磁县贾壁村隋青瓷窑址初探 Hebei Cixian Jiabi Cun Sui Qingci Yaozhi Chutan. *Kaogu* 10: 546-548.

FENG, XIANMING. [冯先铭], 1964a. 河南密县、登封唐宋古窑址调查 Henan Mixian, Dengfeng Tangsong Guyaozhi Diaocha. *Wenwu* 3: 47-55.

FENG, XIANMING. [冯先铭], 1964b. 河南密县、登封唐宋窑址调查简报 Henan Mixian, Dengfeng Tongsong Yaozhi Diaocha Jianbao. *Wenwu* 2: 54-62.

FENG, XIANMING. [冯先铭], 1984. 山西浑源古窑址调查 Shanxi Hunyuan Guyaozhi Diaocha, in W.W.B.J.W.Y.H. 文物编辑委员会 (ed.) *中国古代窑址调查发掘报告集 Zhongguo Gudai Yaozhi Diaocha Fajue Baogao Ji*: 416-421. Beijing: Wenwu Chubanshe.

FENG, XIANMING. [冯先铭], 2000. *中国古陶瓷文献集释 Zhongguo Gutaoci Wenxian Jishi*. Taiwan: Yishujia Chubanshe Press.

FENG, XIANMING. [冯先铭], 2009. *中国陶瓷 Zhongguo Taoci [Chinese Ceramics]*. Shanghai: Shanghai Guji Chubanshe.

FENG, XIANMING & LI, HUIBING. [冯先铭 & 李辉柄], 2005a. *故宫博物院藏中国古代窑址标本: 河北卷 Gugong Bowuyuan Cang Zhongguo Gudai Yizhi Biaoben: Hebei Juan*. Zijincheng Chubanshe.

FENG, XIANMING & LI, HUIBING. [冯先铭 & 李辉柄], 2005b. *故宫博物院藏中国古代窑址标本: 河南卷 Gugong Bowuyuan Cang Zhongguo Gudai Yizhi Biaoben: Henan Juan*. Zijincheng Chubanshe.

FENG, XIAOQI. [冯小琦], 2012. *Discussions on Fujian and Guangdong Ceramic Industries, a visit to the Palace Museum, Beijing, China [personal communication]*.

FENG, YI. [冯沂], 1995. 山东临沂朱陈古瓷窑址调查 Shandong Linyi Zhuchen Guci Yaozhi Diaocha. *Kaogu*: 761-763.

FENG, YONGQIAN. [冯永谦], 1975. 叶茂台辽墓出土的陶瓷器 Yemaotai Liaomu Chutu De Taociqi. *Wenwu* 12: 40-45, 48.

FERNANDO, MALIK 1990. A Preliminary Report on Some Artifacts from the Galle Harbour. *The Third National Archaeological Congress.* Colombo.

FINLAY, ROBERT. 2010. *The pilgrim art: cultures of porcelain in world history*. Univ of California Press.

FISHER, STANLEY W. 1989. *English Blue and White Porcelain of the 18th Century: An Illustrated Descriptive Account of the Early Soft Paste Productions of Bow, Chelsea, Lowestoft, Derby, Longton Hall, Bristol, Worcester, Caughley, and*

Liverpool Potters, Circa 1740-1800. Fitzhouse Books.

FJSBWG. [福建省博物馆], 1982. 福建松溪垌场北宋窑址试掘简报 A Northern Song Kiln Site Excavated at Jiongchang, Songxi, Fujian. *考古学集刊 Kaoguxue Jikan* 2: 167-170.

FJSBWG. [福建省博物馆], 1984. 福建建阳芦花坪窑址发掘简报 Fujian Jianyang Luhuaping Yaozhi Fajue Baogao, in W.W.B.J.W.Y.H. 文物编辑委员会 (ed.) *中国古代窑址调查发掘报告集 Zhongguo Gudai Yaozhi Diaocha Fajue Baogao Ji*: 137-145. Beijing: Wenwu Chubanshe.

FJSBWG. [福建省博物馆], 1987. 福建漳浦县古窑址调察 Fujian Zhangpuxian Guyaozhi Diaocha. *Kaogu* 2: 119-123.

FJSBWG. [福建省博物馆], 1990a. *德化窑 Dehua Yao*. Beijing: Wenwu Chubanshe.

FJSBWG. [福建省博物馆], 1990b. 建阳将口唐窑发掘简报 Jianyang Jiangkou Tang Yao Fajue Jianbao. *东南文化 Dongnan Wenhua* 3: 135-141.

FJSBWG. [福建省博物馆], 1993. 福建惠安银厝尾古窑址发掘简报 Fujian Huian Yincuowei Guyaozhi Fajue Jianbao. *Kaogu* 1: 37-41.

FJSBWG. [福建省博物馆], 1994. 福州五代夹道遗址发掘报告 Fuzhou Wudai Jiadao Yizhi Fajue Baogao. *福建文博 Fujian Wenbo* 2: 34-55.

FJSBWG. [福建省博物馆], 1996. 福建怀安窑址发掘报告 Fujian Huai'an Yaozhi Fajue Baogao. *福建文博 Fujian Wenbo* 1: 3-34.

FJSBWG. [福建省博物馆], 1998. 福建平和县南胜田坑窑址发掘报告 Fujian Pinghe Xian Nansheng Tiankeng Yaozhi Fajue Baogao. *福建文博 Fujian Wenbo* 1: 4-30.

FJSBWG. [福建省博物馆], 2000a. 磁灶土尾庵窑发掘简报 Cizao Tuwei'an Yao Fajue Jianbao. *福建文博 Fujian Wenbo* 1: 25-35.

FJSBWG. 2000b. 南平茶洋窑址 1995-1996 年度发掘报告 Annual Brief Excavation Report of the Chayang Kiln Site in Nanping (1995-1996). *Fujian Wenbo 福建文博* 2: 50-59.

FJSBWG. [福建省博物馆], 2000c. 武夷山遇林亭窑址发掘报告 Excavation

Report of the Yulinting Kiln Site in Wuyishan. *福建文博 Fujian Wenbo* 2: 20-49.

FJSBWG. [福建省博物馆], 2001. 华安东溪 1999 年度调查 Hua'an Dongxi 1999 Niandu Diaocha. *福建文博 Fujian Wenbo* 2: 50－69.

FJSBWY. [福建省博物院], 1959. 将乐县发现唐代窑址 Jiangle Xian Faxian Tangdai Yaozhi, *福建考古资料汇编 1953-1959 Fujian Kaogu Ziliao Huibian 1953-1959*: 34-35. Beijing: Kexue Chubanshe.

FJSBWY, DHXWWGLWYH & DHTCBWG. [福建省博物院, 德化县文物管理委员会 & 德化陶瓷博物馆], 2006. 德化明代甲杯山窑址发掘简报 Dehua Mingdai Jiabeishan Yaozhi Fajue Jianbao. *福建文博 Fujian Wenbo* 2: 1-15.

FJSBWY, QZSWBZX & NASWGB. [福建省博物院, 泉州市文保中心 & 南安市文管办], 2008. 南安寮仔窑发掘简报 Nan'an Liaozai Yao Fajue Jianbao. *福建文博 Fujian Wenbo* 4: 1-11.

FJSWWGLWYH. [福建省文物管理委员会], 1958. 同安县汀溪水库古瓷窑调查记 Tong'an Xian Tingxi Shuiku Ciyao Diaocha Ji. *Wenwu* 2: 32-33.

FLECKER, MICHAEL. 2001. A ninth-century AD Arab or Indian shipwreck in Indonesia: First evidence for direct trade with China. *World Archaeology* 32: 335-354.

FLECKER, MICHAEL. 2002. *The archaeological excavation of the 10th Century: Intan shipwreck*. British Archaeological Reports.

FLECKER, MICHAEL. 2003. The thirteenth-century Java Sea wreck: A Chinese cargo in an Indonesian ship. *The Mariner's Mirror* 89: 388-404.

FOUCHÉ, LEO, GARDNER, GUY A & COERTZE, PIETER JOHANNES. 1937. *Mapungubwe, ancient Bantu civilization on the Limpopo*. Cambridge: Cambridge University Press.

FOX, ROBERT. 1967. The Archeological Record of Chinese Influences in the Philippines. *Philippine Studies: Historical and Ethnographic Viewpoints* 15: 41-62.

FPSM. [馮平山博物館], 1985. *Ceramic Finds from Tang and Song Kilns in Guangdong*. Hongkong: Fung Ping Shan Museum.

FRANK, ANDRE GUNDER. 1998. *Reorient: Global Economy in the Asian Age*. Berkeley: University of California Press.

FRANKE, HERBERT & TWITCHETT, DENIS. 1994. *The Cambridge History of China: Alien regimes and border states, 907-1368*. Cambridge: Cambridge University Press.

FU, SONGLIANG & WANG, SHANG. [傅宋良 & 王上], 1988. 邵武四都青云窑址调查简报 Shaowu Sidu Qingyun Yaozhi Diaocha Jianbao. *福建文博 Fujian Wenbo* 1: 19-22.

FU, SONGLIANG, ZHANG, JIA & LIN, ZHONGYU. [傅宋良, 张家 & 林忠干], 1990. 福建建阳牛皮仑唐代窑址调查 Fujian Jianyang Niupilun Tangdai Yaozhi Diaocha. *江西文物 Jiangxi Wenwu* 4: 005.

FU, YONGCAI & GU, ZHANG. [符永才 & 顾章], 1990. 浙江南田海岛发现唐宋遗物 Zhejiang Nantian Haidao Faxian Tangsong Yiwu. *Kaogu* 11: 1048-1050.

GARLAKE, P. S. 1978. Fieldwork at Al-Huwailah, Site 23, in B. DE CARDI (ed.) *Qatar Archaeological Report: Excavations 1973*: 170-179. Oxford: Oxford University Press.

GARLAKE, PETER. 1976. An investigation of Manekweni, Mozambique. *AZANIA: Journal of the British Institute in Eastern Africa* 11: 25-47.

GDSBWG. [广东省博物馆], 1974. 广东省西沙群岛文物调查简报 Guangdong Sheng Xisha Qundao Wenwu Diaocha Jianbao. *Wenwu* 10: 1-29.

GDSBWG. [广东省博物馆], 1981. *潮州笔架山宋代窑址发掘报告 Chaozhou Bijiashan Songdai Yaozhi Fajue Baogao*. Beijing: Wenwu Chubanshe.

GDSBWG. [广东省博物馆], 1982. 广东始兴晋-唐墓发掘报告 Guangdong Shixing Jin-Tang Mu Fajue Baogao. *Kaoguxue Jikan 考古学集刊* 2 113-133.

GDSWGH. [广东省文管会], 1955. 广州西郊晋墓清理报导 Guangzhou Xijiao Jinmu Qingli Baodao. *Wenwu* 8: 24-32.

GDSWWH. [广东省文管会], 1959. 佛山专区的几处古窑址调查简报 Foshan Zhuanqu De Jichu Guyaozhi Diaocha Jianbao. *Wenwu* 12.

GE, JIFANG. [葛季芳], 1987. 云南建水窑的调查和分析 Yunnan Jianshuiyao De Diaocha He Fenxi. *Kaogu* 1: 69-74.

GE, JIFANG. [葛季芳], 1990. 云南禄丰县元代罗川窑和白龙窑 Yunnan Lufengxian Yuandai Luochuanyao He Bailongyao. *Kaogu* 8: 762-764.

GE, JIFANG & LI, YONGHENG. [葛季芳 & 李永衡], 1980. 云南玉溪古窑遗址调查 Yunnan Yuxi Guyao Yizhi Diaocha. *Kaogu* 3: 284-286.

GE, TIEYING. [葛铁鹰], 2003. 阿拉伯古籍中的中国 (七) A La Bo Guji Zhong De Zhongguo, part 7. *阿拉伯世界 A La Bo Shi Jie* 5: 50-55.

GENG, BAO CHANG. 1993a. *明清瓷器鉴定 Ming Qing Ciqi Jianding*. Zijincheng Chubanshe.

GENG, BAOCHANG. [耿宝昌], 1993b. *Mingqing Ciqi Jianding 明清瓷器鉴定*. Zijincheng Chubanshe.

GERRITSEN, ANNE & MCDOWALL, STEPHEN. 2012. Material Culture and the Other: European Encounters with Chinese Porcelain, ca. 1650-1800. *Journal of World History* 23: 87-113.

GGBWY, JXSWWKGYJS & JDZSTCKGYJS. [故宫博物院, 江西省文物考古研究所 & 景德镇市陶瓷考古研究所], 2007a. 江西景德镇丽阳碓臼山元代窑址发掘简报 A Brief Excavation Report on the Kiln of the Yuan Dynasty Located in Duijiushan,Jingdezhen City,Jiangxi Province. *Wenwu* 3: 9-16.

GGBWY, JXSWWKGYJS & JDZSTCKGYJS. [故宫博物院, 江西省文物考古研究所 & 景德镇市陶瓷考古研究所], 2007b. 江西景德镇丽阳蛇山五代窑址清理简报 Jiangxi Jingdezhen Liyang Sheshan Wudai Yaozhi Qingli Jianbao. *Wenwu* 3: 4-8, 47.

GLBWG. 1994. 广西桂州窑遗址 Guangxi Guizhou Yao Yizhi. *Kaogu Xuebao* 4: 499-526.

GODDIO, FRANCK, DE SAINT MICHEL, EVELYNE JAY GUYOT & JUNCQUA-NAVEAU, DANIÈLE. 1999. *Griffin: on the route of an Indiaman*. Periplus Publ.

GONG, CHANG. [贡昌], 1984. 谈婺州窑 Tan Wuzhou Yao, in W.W.B.J.W.Y.H. 文物编辑委员会 (ed.) *中国古代窑址调查发掘报告集 Zhongguo Gudai Yaozhi Diaocha Fajue Baogao Ji*: 22-31. Beijing: Wenwu Chubanshe.

GONG, CHANG. [贡昌], 1987. 浙江武义县水碓周五代北宋窑址调查 Zhejiang Wuyixian Shuidui Wudai Beisong Yaozhi Diaocha. *Kaogu*: 449-452.

GONG, CHANG. [贡昌], 1989. 浙江龙游，衢县两处唐代古窑址调查 Zhejiang Longyou, Quxian 两处唐代古窑址调查. *Kaogu*: 607-610.

GU, FENG. [顾风], 1993. 唐代扬州与长沙窑兴衰关系新探 Tangdai Yangzhou Yu Changsha Yao Xingshuai Guangxi Xintan. *东南文化 Dongnan Wenhua* 5: 179-182.

GU, YUNQUAN. [古运泉], 1987. 广东梅县古墓葬和古窑址调查、发掘简报 Guandong Meixian Gumuzang he Guyaozhi Diaocha, Fajue Jianbao. *Kaogu* 3: 207-215.

GUO, JIQIAO. [郭济桥], 2001. 井陉窑的发现和研究 Jingxingyao De Faxian Yu Yanjiu. *中国陶瓷 Zhongguo Taoci* 37: 46-47.

GUO, MINGHUA. [郭明华], 2006. 宋代景德镇青白瓷的历史分期及其特征 Songdai Jingdezhen Qingbaici De Lishi Fenqi Jiqi Tezheng. *Jingdezhen Taoci 景德镇陶瓷* 16: 17-18.

GUO, XUELEI. [郭学雷], 2005. *明代磁州窑瓷器 Mingdai Cizhouyao Ciqi*. Beijing: Wenwu Chubanshe Press.

GUY, JOHN. 1986. *Oriental Trade Ceramics in South-East Asia, Ninth to Sixteenth Centuries*. Oxford University Press.

GUY, JOHN. 2005. Early ninth century Chinese export ceramics and the Persian Gulf connection: the Belitung shipwreck evidence. *Chine-Méditerranée, Routes et échanges de la céramique avant le XVIe siècle. Taoci,(Editions SFECO-Findalkly, Suilly-la-Tour, France)* 4: 145-152.

GXZZZZQWWGZD. [广西壮族自治区文物工作队], 1984. 广西永福窑田岭宋代窑址发掘简报 Guangxi Yongfuyao Tianling Songdai Yaozhi Fajue Jianbao, in W.W.B.J.W.Y.H. 文物编辑委员会 (ed.) *中国古代窑址调查发掘报告集 Zhongguo Gudai Yaozhi Diaocha Fajue Baogao Ji*: 201-212. Beijing: Wenwu Chubanshe.

GXZZZZQWWGZD. [广西壮族自治区文物工作队], 1987. 广西容县城关宋代瓷

窑 Guangxi Rongxian Chengguan Songdai Ciyao. *考古学集刊 Kaoguxue Jikan* 5.

GZSWWGLWYH. [广州市文物管理委员会], 1956. 三年来广州市古墓葬的清理和发现 Sannianlai Guangzhou Shi Gumuzang De Qingli He Faxian. *文物参考资料 Wenwu Cankao Ziliao* 5: 21-32.

GZSWWGLWYH. [广州市文物管理委员会], 1958. *广州西村古窑遗址 Guangzhou Xicun Guyao Yizhi*. Beijing: Wenwu Chubanshe.

GZSWWGLWYH. [广州市文物管理委员会], 1981. *广州汉墓 Guangzhou Hanmu*. Beijing: Wenwu Chubanshe.

GZSWWGLWYH & AMOCUH. [广州市文物管理委员会 & 香港中文大学艺术博物馆], 1987. *广州西村窑 Guangzhou Xicun Yao*. Hongkong: Centre for Chinese Archaeology and art of Chinese University of Hongkong 香港中文大学中国考古艺术研究中心.

HALLETT, J. 2010. Pearl Cups like the Moon, in Shipwreced, in R. KRAHL, J. GUY, J.K. WILSON & J. RABY (eds.) *Tang Treasures and Monsoon Winds*: 75-81. Singapore: Arthur M. Sackler Gallery, Smithsonian Institution.

HAMER, FRANK & HAMER, JANET. 1975. *The potter's dictionary of materials and techniques*. University of Pennsylvania Press.

HAN, QIAN & FENG, XIAOQI 2012. 故宫博物院 2012 年安徽窑址调查报告 Gugong Bowuyuan 2012 Nian Anhui Yaozhi Diaocha Baogao. Beijing: Palace Museum of Beijing.

HAN, WEI, WANG, ZHANKUI, JIN, XIANYONG, CAO, WEI, REN, ZHOUFANG, HUAI, JIANBANG & FU, SHENGQI. [韩伟, 王占奎, 金宪镛, 曹玮, 任周芳, 淮建邦 & 傅升岐], 1988. 扶风法门寺塔唐代地宫发掘简报 Fufeng Famensi Ta Tangdai Digong Fajue Jianbao. *Wenwu* 10: 1-28.

HANSMAN, JOHN. 1985. *Julfār, an Arabian Port: Its Settlement and Far Eastern Ceramic Trade from the 14th to the 18th Centuries*. Psychology Press.

HARDY-GUILBERT, CLAIRE 2001. Archaeological research at al-Shiḥr, the Islamic port of Ḥaḍramawt, Yemen (1996-1999). *Proceedings of the Seminar for Arabian Studies.*

HARDY-GUILBERT, CLAIRE 2005. The harbour of al-Shihr, Hadramawt, Yemen: Sources and archaeological data on trade. *Proceedings of the Seminar for Arabian Studies.*

HARDY-GUILBERT, CLAIRE & ROUGEULLE, AXELLE 1997. Al-Shihr and the southern coast of the Yemen: preliminary notes on the French archaeological expedition, 1995. *Proceedings of the Seminar for Arabian Studies.* JSTOR.

HARRISON-HALL, JESSICA. 2001. *Ming Ceramics in the British Museum*. London: The British Museum Press.

HARRISON-HALL, JESSICA, FREESTONE, I. & GAIMSTER, D. 1997. Ding and Other Whitewares of Northern China, *Pottery in the Making: World Ceramic Traditions*: 182-187. London: the British Museum Press.

HARRISON-HALL, JESSICA & KRAHL, R. 2009. *Chinese Ceramics: Highlights of the Sir Percival David Collection*. London: British Museum Press.

HARRISSON, T. 1949. Some Ceramics Excavated in Borneo. *TOCS 1953-1954* 28.

HARRISSON, TOM. 1958. The Ming Gap and Kota Batu, Brunei. *Sarawak Museum Journal* 8: 273-77.

HE, JISHENG, PENG, RUCE & QIU, LICHENG. [何纪生, 彭如策 & 邱立诚], 1984. 广东饶平九村青花窑址调查记 Guangdong Raoping Jiucun Qinghua Yaozhi Diaochaji, in W.W.B.J.W.Y.H. 文物编辑委员会 (ed.) *中国古代窑址调查发掘报告集 Zhongguo Gudai Yaozhi Diaocha Fajue Baogao Ji*: 155-161. Beijing: Wenwu Press.

HE, JISHENG & ZHAO, JINSHUN. [何纪生 & 赵金顺], 1975. 广东封开县都苗宋代窑址调查 Guangdong Fengkaixian Dumiao Songdai Yaozhi Diaocha. *Wenwu* 7: 92-93.

HE, LI. 1996. *Chinese ceramics: the new standard guide*. Thames & Hudson.

HE, SHIWEI, XU, ZHIBIN, LUO, HONGBIN & LIU, ZHIYUN. [贺世伟, 许志斌, 罗宏斌 & 刘志云], 2000. 湖北武汉江夏王麻窑址 1988—1996 年的发掘 Hubei Wuhan Jiangxia Wangma Yaozhi 1988-1996 Nian De Fajue. *考古学报 Kaogu Xuebao* 1: 89-110.

HENG, DEREK TIAM SOON. 2005. *Economic interaction between China and the*

Malacca Straits region, tenth to fourteenth centuries AD. University of Hull.

HNSBWG. [河南省博物馆], 1972. 河南安阳北齐范粹墓发掘简报 Henan Anyang Beiqi Fancui Mu Fajue Jianbao. *Wenwu* 1: 47-57.

HNSBWG. [河南省博物馆], 1974. 河南省新安县古瓷窑遗址调查 Henansheng Xin'an Xian Guciyao Yizhi Diaocha. *Wenwu* 12: 74-79, 81.

HNSBWG. [河南省博物馆], 1975. 河南禹县钧台窑址的发掘 Henan Yuxian Juntai Yaozhi De Fajue. *Wenwu* 6: 354-357.

HNSBWG. [河南省博物馆], 1977. 河南安阳隋代瓷窑址的试掘 Henan Anyang Suidai Ciyao Zhi De Shijue. *Wenwu* 2: 48-53.

HNSWWKGYJS. [河南省文物考古研究所], 1995. 河南临汝严和店汝窑遗址的发掘 Henan Linru Yanhe Dian Ruyao Yizhi De Fajue. *华夏考古 Huaxia Kaogu* 3: 1-11.

HNSWWKGYJS. [河南省文物考古研究所], 2001. *偃师杏园唐墓 Yanshi Xingyuan Tangmu*. Beijing: Wenwu Chubanshe.

HNSWWKGYJS. [河南省文物考古研究所], 2006. 湖南洪江市宋代烟口窑址的发掘 Hunan Hongjiang Songdai Yankou Yaozhi De Fajue. *Kaogu* 11: 38-49.

HNSWWKGYJS & ZGWHYCYJY. [河南省文物考古研究所 & 中国文化遗产研究院], 2011. 河南巩义市白河窑遗址发掘简报 Henan Gongyi Shi Baiheyao Yizhi Fajue Jianbao. *Huaxia Kaogu* 1: 26-86.

HNSWWKGYJS & ZGWWYJS. [河南省文物考古研究所 & 中国文物研究所], 2007. 河南巩义市黄冶窑址发掘简报 Henan Gongyi Shi Huangye Yaozhi Fajue Jianbao. *Huaxia Kaogu* 4: 106-129.

HNSWWYJS. [河南省文物研究所], 1984a. 河南内乡大窑店瓷窑遗址的调查 Henan Neixiang Dayaodian Ciyao Yizhi De Diaocha, in W.W.B.J.W.Y.H. 文物编辑委员会 (ed.) *中国古代窑址调查发掘报告集 Zhongguo Gudai Yaozhi Diaocha Fajue Baogao Ji*: 310-317. Beijing: Wenwu Chubanshe.

HNSWWYJS. [河南省文物研究所], 1984b. 河南宜阳窑调查简报 Henan Yiyang Yao Diaocha Jianbao, in W.W.B.J.W.Y.H. 文物编辑委员会 (ed.) *中国古代窑址调查发掘报告集 Zhongguo Gudai Yaozhi Diaocha Fajue Baogao Ji*: 318-325. Beijing: Wenwu Chubanshe.

HNSWWYJS. [河南省文物研究所], 1992. 宝丰清凉寺汝窑址第二、三次发掘简报 Baofeng Qingliangsi Ru Yaozhi Di Er, San Ci Fajue Jianbao. *华夏考古 Huaxia Kaogu* 3: 140-53.

HO, CHUIMEI. 1994a. The Production and Distribution of Zhejiang Green Glazed Wares: Preface to the Conference Proceedings, in C.M. HO (ed.) *New Light on Chinese Yue and Longquan Wares: Archaeological Ceramics Found in Eastern and Southern Asia, A.D. 800-1400*: ix-xxvi. Hongkong: Hongkong University.

HO, CHUIMEI. 1994b. Yue-type and Longquan-type Green Glazed Wares, *New Light on Chinese Yue and Longquan Wares: Archaeological Ceramics Found in Eastern Southern Asia, AD 800-1400*: 103-119. Hongkong: Hongkong University.

HO, CHUIMEI. 2001. The Ceramic Boom in Minnan During Song and Yuan Times. *The Emporium of the World: Maritime Quanzhou, 1000-1400* 49: 237-281.

HOBSON, ROBERT LOCKHART. 1925. *The later ceramic wares of China*. Benn Brothers.

HOBSON, ROBERT LOCKHART, RACKHAM, BERNARD & KING, WILLIAM. 1931. *Chinese ceramics in private collections*. London: Halton & T. Smith, ltd.

HORTON, MARK. 1986. Asiatic colonization of the East African coast: The Manda evidence. *Journal of the Royal Asiatic Society of Great Britain & Ireland* 118: 201-213.

HORTON, MARK CHATWIN, BROWN, HELEN W & MUDIDA, NINA. 1996. *Shanga: the archaeology of a Muslim trading community on the coast of East Africa*. British Inst in Eastern Africa.

HORTON, MARK & CLARK, C. 1985. Archaeological survey of Zanzibar. *AZANIA: Journal of the British Institute in Eastern Africa* 20: 167-171.

HOURANI, GEORGE FADLOU. 1995. *Arab seafaring: in the Indian Ocean in ancient and early medieval times*. Princeton University Press.

HOWARD, DAVID SANCTUARY & WAGNER, ANTHONY. 1974. *Chinese Armorial Porcelain*. Faber & Faber.

HSIEH, MING-LIANG. 2010. White Warewith Green Decor, in R. KRAHL, J. GUY, K. WILSON & J. RABY (eds.) *Shipwrecked: Tang Treasures and Monsoon Winds*: 161-176. Singapore Smithsonian Institution.

HU, RULEI. [胡如雷], 1996. *隋唐五代社会经济史论稿 Sui Tang Wudai Shehui Jingjishi Lungao*. Beijing: Zhongguo Shehui Kexue Chubanshe Press.

HU, YICI. [胡义慈], 1964. 南城县株良公社古窑址调查记 Nanchengxian Zhuliang Gongshe Yaozhi Diaocha Ji. *南方文物 Nanfang Wenwu* 3: 4.

HU, YUEQIAN. [胡悦谦], 1988. 谈寿州瓷窑 Tan Shouzhou Ciyao. *Kaogu* 8: 735-750.

HUANG, BINGYUAN. [黄炳元], 1957. 福建南安石壁水库古窑址试掘情况 Fujian Nan'an Shibi ShuikuYaozhi Shijue Qingkuang. *Wenwu* 12: 53-55.

HUANG, DONGMEI. [黄冬梅], 1996. 江西樟树元纪年墓出土文物 Jiangxi Zhangshu Yuan Jinianmu Chutu Wenwu. *南方文物 Nanfang Wenwu* 4.

HUANG, HUIYI. [黄慧怡], 2004. 广东唐宋制瓷手工业遗存分期研究 Guangdong Tangsong Zhici Shougongye Yicun Fenqi Yanjiu. *东南文化 Dongnan Wenhua*: 44-49.

HUANG, JING. [黄静], 2005. 广东宋代外销瓷及其与耀州窑的关系 Guangdong Songdai Waixiaoci Ji Qi Yu Yaozhou De Guanxi, in YZYBWG (ed.) *中国耀州窑国际学术讨论会文集 Zhongguo Yaozhou Yao Guoji Xueshu Taolun Hui Wenji.*

HUANG, JING. [黄静], 2011. 广东龙泉系青瓷浅析 Guangdong Longquan Xi QIngci Qianxi, in ZGGTCXX (ed.) *龙泉窑研究 Longquan Yao Yanjiu*: 483-491. Beijing: Gugong Chubanshe.

HUANG, N. Z. [黄念曾], 2006a. 长沙窑尚待解决的几个问题之我见 Changshayao Shangdai Jiejue De Jige Wenti Zhi Wo Jian. *陶瓷科学与艺术 Taoci Kexue Yu Yishu* 1: 51-53.

HUANG, PUHUA. [黄朴华], 2003. 湖南望城县长沙窑 1999 年发掘简报 Hunan Wangchengxian Changshayao 1999 Nian Fajue Jianbao. *Kaogu* 5: 49-62.

HUANG, RAY. 1969. Fiscal Administration During the Ming Dynasty, in C.O. HUCKER (ed.) *Chinese Government in Ming Times*: 73-128. New York and London:

Columbia University Press.

HUANG, WEI & HUANG, QINGHUA. [黄薇 & 黄清华], 2012. 元青花瓷器早期类型的新发现—从实证角度论元青花瓷器的起源 Yuanqinghua Ciqi Zaoqi Leixing De Xin Faxian *Wenwu*: 79-88.

HUANG, WEIWEN. [黄卫文], 2009. 邢窑白瓷与巩义窑白瓷的比较研究 Xingyao Baici Yu Gongyi Yao Baici De Bijiao Yanjiu, in ZGGTCYJH (ed.) *中国古陶瓷研究 Zhongguo Gutaoci Yanjiu* 167-182. Beijing: Zijincheng Chubanshe.

HUANG, YIJUN. [黄义军], 2006b. 宋代青白瓷起源的背景初探 Songdai Qingbaici Qiyuan De Beijing Chutan. *考古与文物 Wenwu Yu Kaogu*: 81-88.

HUANG, YIJUN. [黄义军], 2010. *宋代青白瓷的历史地理研究 Songdai Qingbai Ci De Lishi Dili Yanjiu [A Historical and Geographcial Study of Qingbai Ceramics in Song Dynasty]*. Beijing: Wenwu Chubanshe Press.

HUANG, YING. [黄莹], 2014. 从杜松罐看广州港的兴衰 Cong Dusong Guan Kan Guangzhou Guang De Xingshuai. Unpublished Peking University, a Case Study

HUANG, YING. [黄莹], 2016. 唐代海上絲綢之路的廣東青瓷— 2014 年廣東新會官沖窑址和館藏實物調查記 The Guangdong Celadons on the Maritime Silkroad in Tang Dynasty- The Research of the Guanchong Kilns Sites and Collections in Guangdong 2014. *丝瓷之路 Si Ci Zhi Lu*: Forthcoming.

HUANG, YISHOU. [黄颐寿], 1989. 江西铜鼓发现唐代窑址 Jiangxi Tonggu Faxian Tangdai Yaozhi. *Kaogu*: 91-92.

HUANG, YUZHI & YANG, SHAOXIANG. [黄玉质 & 杨少祥], 1983. 广东潮州笔架山宋代瓷窑 Guangdong Chaozhou Bijiashan Songdai Ciyao. *Kaogu* 6: 517-525.

HUGHES-STANTON, PENELOPE & KERR, ROSE. 1980. *Kiln Sites of Ancient China: Recent Finds of Pottery and Porcelain*. London: Oriental Ceramic Society.

HUO, HONGWEI. [霍宏伟], 2008. 河南洛阳市隋唐东都外郭城五座窑址的发掘 Henan Luoyangshi Suitang Dongdu Waiguocheng Wuzuo Yaozhi De Fajue. *Kaogu* 2: 43-54.

HUO, JIENA & LIN, LI. [霍杰娜 & 林立], 2004. 福建东山岛宋元窑址调查报告 Fujian Dongshan Dao Songyuan Yaozhi Diaocha Baogao. *南方文物 Nanfang Wenwu*: 11-15.

HUSSAIN, SYED EJAZ. 2003. *The Bengal Sultanate: Politics, Economy and Coins, AD 1205-1576*. Manohar Publishers.

HZSWWKGS. [杭州市文物考古所], 2002. 杭州老虎洞南宋官窑址 Hangzhou Laohudong Nansong Guanyaozhi. *Wenwu* 10.

INGRAHAM, M., JOHNSON, T., RIHANI, B. & SHATLA, I. 1981. Preliminary Report on a Reconnaissance Survey of the Northerwestern Province (with a note on a brief survey of the Northern Province). *Atlal* 5: 59-84.

INSOLL, TIMOTHY. 2005. *The Land of Enki in the Islamic Era: Pearls, Palms, and Religious Identity in Bahrain*. London: Routledge.

JACKSON, PETER. 2003. *The Delhi sultanate: a political and military history*. Cambridge University Press.

JIA, ZHONGMIN & JIA, YONGLU. [贾忠敏 & 贾永禄], 1987. 河北省内丘县邢窑调查简报 Hebei Sheng Neiqiuxian Xian Xingyao diaocha Jianbao. *Wenwu* 9: 1-10.

JIAN, BO. [剑波], 1998. 安徽歙县元代窖藏白瓷 Anhui Shexian Yuandai Jiaocang Baici. *收藏家 Shoucang Jia* 8: 60-61.

JIN, BAIDONG. [金柏东], 1990. 瓯窑探略 Ou Yao Tan Lue, in ZGGTCYJH (ed.) *中国古陶瓷研究 Zhongguo Gutaoci Yanjiu* Zijincheng Chubanshe.

JIN, ZUMING. [金祖明], 1958. 浙江黄岩古代青瓷窑址调查记 Zhejiang Huangyan Gudai Qingci Yaozhi Diaocha Ji. *Kaogu*: 44-47.

JIN, ZUMING. [金祖明], 1965. 温州地区古窑址调查纪略 Wenzhou Diqu Guyaozhi Diaocha Jilue. *Wenwu*: 21-34.

JXSWWGZD. [江西省文物工作队], 1984a. 江西吉州窑遗址发掘简报 Jiangxi Jizhouyao Yizhi Fajue Jianbao. *Kaogu* 5: 481-489.

JXSWWGZD. [江西省文物工作队], 1984b. 江西萍乡南坑古窑调查 Jiangxi Pingxiang Nankeng Guyao Diaocha. *Kaogu* 3: 264-270.

JXSWWGZD. [江西省文物工作队], 1985. 江西南丰白舍窑调查纪实 Jiangxi Nanfeng Baisheyao Diaocha Jishi. *Kaogu* 3: 222-233.

JXSWWKGYJS. [江西省文物考古研究所], 1990. 江西赣州七里镇窑址发掘简报 Jiangxi Ganzhou Qilizhen Yaozhi Fajue Jianbao. *Wenwu* 4.

JXSWWKGYJS. [江西省文物考古研究所], 2003. 江西临川汤周古窑址调查 Jiangxi Linchuan Tangzhou Guyaozhi Diaocha, in ZGGTCYJH (ed.) *中国古陶瓷研究 Zhongguo Gutaoci Yanjiu* Beijing: Zijincheng Chubanshe.

JXSWWKGYJS & JDZMYBWG. [江西省文物考古研究所 & 景德镇民窑博物馆], 2007. *景德镇湖田窑址 Jingdezhen Hutian Yaozhi*. Beijing: Wenwu Chubanshe.

JXSWWKGYJS & JSLNXWGS. [江西省文物考古研究所 & 江西龙南县文管所], 2013. 江西龙南围角头窑业堆积清理简报 Jiangxi Longnan Weijiaotou Yaoye Duiji QIngli Jianbao. *南方文物 Nanfang Wenwu*: 21, 42-46.

JXSWWKGYJS & JXSYXBWG. [江西省文物考古研究所 & 江西上犹县博物馆], 2012. 江西上犹县排上山窑址发掘简报 Jiangxi Shangyouxian Paishangshan Yaozhi Fajue Jianbao. *南方文物 Nanfang Wenwu* 1: 31-37.

JXSWWKGYJS & YSXBWG. [江西省文物考古研究所 & 玉山县博物馆], 2007. 江西玉山渎口窑址发掘简报 Jiangxi Yushan Dukou Yaozhi Fajue Jianbao. *Wenwu* 6: 16-29.

JZSWWGZD. [江西省文物工作队], 1995. 河南省焦作市牛庄瓷窑遗址二号灰坑 Henansheng Jiaozuoshi Niuzhuang Ciyao Yizhi Erhao Huikeng. *北方文物 Beifang Wenwu* 2: 35-40.

KAMEI, M. 1994. Chronology of Longquan Wares of the Song and Yuan Periods, in C. HO (ed.) *New Light on Chinese Yue and Longquan Wares: Archaeological Ceramics Found in Eastern and Southern Asia, AD 800-1400*: 46-84. Hong Kong: The University of Hong Kong.

KARASHIMA, NOBURU 2004. In search of Chinese ceramic-sherds in South India and Sri Lanka. Tokyo: Taisho University Press.

KAUZ, RALPH. 2010. *Aspects of the Maritime Silk Road: From the Persian Gulf to the East China Sea*. Otto Harrassowitz Verlag.

KAUZ, RALPH & PTAK, RODERICH. 2001. Hormuz in Yuan and Ming sources. *Bulletin de l'Ecole française d'Extrême-Orient* 88: 27-75.

KE, FENGMEI & CHEN, HAO. 1995. 福建莆田古窑址 Fujian Putian Guyaozhi. *Kaogu* 7: 606-613.

KEALL, EJ 1983. Zabid and its hinterland: 1982 report. *Proceedings of the Seminar for Arabian Studies.* JSTOR.

KENNET, DEREK. 1994. Jazīrat al-Ḥulayla: Early Julfār. *Journal of the Royal Asiatic Society* 4: 163-212.

KENNET, DEREK 2002. The development of northern Raʾs al-Khaimah and the 14th-century Hormuzi economic boom in the lower Gulf. *Proceedings of the Seminar for Arabian Studies.* JSTOR.

KENNET, DEREK. 2003. Julfar and the urbanisation of Southeast Arabia. *Arabian archaeology and epigraphy* 14: 103-125.

KENNET, DEREK. 2004. *Sasanian and Islamic pottery from Ras al-Khaimah: classification, chronology and analysis of trade in the Western Indian Ocean*. Archaeopress.

KENNET, DEREK. 2007. The decline of eastern Arabia in the Sasanian period. *Arabian archaeology and epigraphy* 18: 86-122.

KENNET, DEREK, RAN, ZHANG & PRIESTMAN, SETH. 2011. 近东地区考古已发现的龙泉窑瓷器—英国威廉姆森藏品及斯拉夫一直调查藏品中的龙泉窑青瓷简介 Jindong Diqu Kaogu Yizhi Faxian De Longquan Yao Ciqi, in I.O.C. CERAMICS (ed.) *Longquan Yao Yanji*: 447-457. Beijing: Gugong Chubanshe.

KERR, ROSE. 1986. *Chinese ceramics: porcelain of the Qing dynasty, 1644-1911*. Victoria & Albert Pubns.

KERR, ROSE. 2002. Chinese Porcelain in the Gulf Region. *Journal of Oman Studies* 12: 125-131.

KERR, ROSE. 2004. *Song dynasty ceramics*. Victoria & Albert Museum.

KERR, ROSE, AYERS, JOHN & HO, CHUIMEI. 2002. *Blanc de Chine: porcelain from Dehua*. RoutledgeCurzon.

KERR, ROSE, MENGONI, LUISA E & WILSON, MING. 2011. *Chinese export ceramics*. V

& A Publishing.

KERR, ROSE & WOOD, NIGEL. 2004. *Science and civilisation in China, vol. 5, chemistry and chemical technology. Part 12, ceramic technology*. series 12: ceramic technology). Cambridge University Press.

KERVRAN, MONIK, HIEBERT, FREDRIK TALMAGE & ROUGEULLE, AXELLE. 2005. *Qal'at Al-Bahrain: A Trading and Military Outpost 3rd Millennium BC-17th Century AD*. Brepols Pub.

KHAN, FAZAL AHMAD. 1969. *Banbhore: A Preliminary Report on the Recent Archaeological Excavations at Banbhore*. Department of Archaeology and Museums, Ministry of Education & Scientific Research, Government of Pakistan.

KIM, YEONGMI. 2012. 新安沉船与海上丝绸之路 Sinan Shipwreck and Mairitime Silk Road, in Q. SHEN (ed.) *大元帆影 Sailing from the Great Yuan Dynasty*: 20-31. Beijing: Wenwu Chubanshe Press.

KIRKMAN, JAMES. 1952. The Excavations at Kilepwa: An Introduction to the Medieval Archaeology of the Kenya Coast. *The Antiquaries Journal* 32: 168-184.

KIRKMAN, JAMES. 1954. *The Arab city of Gedi: Excavations at the Great Mosque, architecture and finds*. Oxford University Press.

KIRKMAN, JAMES. 1957. Kinuni—an Arab Manor on the Coast of Kenya. *Journal of the Royal Asiatic Society of Great Britain & Ireland (New Series)* 89: 145-150.

KIRKMAN, JAMES. 1959. Mnarani of Kilifi: the mosques and tombs. *Ars Orientalis*: 95-112.

KOBAYASHI, H. 2009. 白瓷的诞生 Baici De Dansheng, in ZGGTCYJH (ed.) *中国古陶瓷研究 Zhongguo Gutaoci Yanjiu* 61-78. Beijing: Zijincheng Chubanshe.

KOYAMA, F. 1973. *陶磁大系 38：天目 Complete of Ceramics Vol 38: Tenmoku*. Tokyo, Japan: 平凡社 Henbosha.

KRAHL, REGINA. 1986a. *Chinese Ceramics in the Topkapi Saray Museum Istanbul: A*

Complete Catalogue. Vol. I, Yuan and Ming Dynasty Celadon Wares. Sotheby's Publications.

KRAHL, REGINA. 1986b. *Chinese Ceramics in the Topkapi Saray Museum Istanbul: A Complete Catalogue. Vol. II, Yuan and Ming Dynasty Porcelains*. Sotheby's Publications.

KRAHL, REGINA. 1986c. *Chinese Ceramics in the Topkapi Saray Museum Istanbul: A Complete Catalogue. Vol. III. Qing Dynasty Porcelains*. Sotheby's Publications.

KRAHL, REGINA. 1986d. Export porcelain fit for the Chinese emperor. Early Chinese blue-and-white in the Topkapĭ Saray Museum, Istanbul. *Journal of the Royal Asiatic Society* 118: 68-92.

KRAHL, REGINA. 2010. Chinese Ceramics in the Late Tang Dynasty, in R. KRAHL, J. GUY, J.K. WILSON & J. RABY (eds.) *Shipwrecked: Tang Treasures and Monsoon Winds*. Singapore: Arthur M. Sackler Gallery, Smithsonian Institution.

KRAHL, REGINA, GUY, JOHN, WILSON, J. KEITH & RABY, JULIAN. 2010. *Shipwrecked: Tang Treasures and Monsoon Winds*. Singapore: Arthur M. Sackler Gallery, Smithsonian Institution.

KUHN, DIETER. 2009. *The age of Confucian rule*. Belknap Press of Harvard University Press.

LANE, ARTHUR & SERJEANT, RB. 1948. Pottery and glass fragments from the Aden littoral, with historical notes. *Journal of the Royal Asiatic Society of Great Britain & Ireland (New Series)* 80: 108-133.

LEI, SHAO, FENG, YI & BI, XIANZHONG. [雷少, 冯毅 & 毕显忠], 2014. 浙江宁波北仑大碶璎珞东汉墓葬与五代窑址发掘简报 Zhejiang Ningbo Beilun Daqi Yingluo Donghan Muzang Yu Wudai Yaozhi Fajue Jianbao. *南方文物 Nanfang Wenwu* 3: 26-30, 37.

LEWIS, MARK EDWARD. 2009. *China's cosmopolitan empire: the Tang dynasty*. Harvard University Press.

LI, BAOPING. Kraak Porcelain from Chinese Tombs and Jingdezhen Kilns:

Discoveries and Associated Issues. Paper presented at the Cultures of Chinese in Global History: 1300-1800, the University of Warwick, 22 April 2010 2010a.

LI, BAOPING, CHEN, YUH-SHIOW & WOOD, NIGEL. 2010a. Chemical Fingerprinting-Tracing the Origins of the Green-Splashed White Ware, in R. KRAHL, J. GUY, J.K. WILSON & J. RABY (eds.) *Shipwrecked: Tang Treasures and Monsoon Winds*: 177-184. Singapore: Arthur M. Sackler Gallery, Smithsonian Institution.

LI, DEBAO. [李德保], 1965. 河南辉县古窑址调查简报 Henan Huixian Guyaozhi Diaocha Baogao. *Wenwu* 11: 35-41.

LI, HUA. [李铧], 1991. 广西兴安县严关宋代窑址调查 Guangxi Xing'anxian Yanguan Songdai Yaozhi Diaocha. *Kaogu* 8: 011.

LI, HUA. [李铧], 2000. Hongwu Minyao Qinghua Yuanqi Yanjiu 洪武民窑青花圆器研究, *Mingdai Minyao Qinghua.* Hebei Renmin Chubanshe.

LI, HUA, WANG, XIAOFEN & WANG, YULING. [李华, 王小芬 & 王玉玲], 1997. 桂林出土的唐代邢, 定窑白瓷及其相关问题探析 Guilin Chutu De Tang Dai Xing, Dingyao Baici Jiqi Xiangguan Wentu Tanxi. *文物春秋 Wenwu Chunqiu* Additional Version: 31-32.

LI, HUIBING. [李辉柄], 1973. 调查浙江鄞县窑址的收获 Diaocha Zhejiang Yinxian Yaozhi De Shouhuo. *Wenwu*: 30-40.

LI, HUIBING. [李辉柄], 1974. 福建省同安窑调查纪略 Fujian Sheng Tong'an Yao Diaocha Jilue. *Wenwu* 11: 80-84.

LI, HUIBING. [李辉柄], 1979a. 莆田窑址初探 Putian Yaozhi Chutan. *Wenwu* 12: 37-42.

LI, HUIBING & LI, ZHIYAN. [李辉柄 & 李知宴], 1980. 河南鲁山段店窑 Henan Lushan Duandian Yao. *Wenwu* 5: 52-60.

LI, JIAN'AN. [栗建安], 1995a. 福建建阳县水吉建窑遗址 1991-1992 年度发掘简报 Fujian Jianyangxian Jishui Jianyao Yizhi 1991-1992 Niandu Fajuejianbao. *Kaogu* 2: 148-154.

LI, JIAN'AN 2010b. 南宋时期福建陶瓷器的外销及相关问题 The Export of Fujian Ceramics in the Southern Song Period and Related Issues. *In:* N.P. MUSEUM (ed.) *文艺绍兴—南宋艺术与文化特展 Dynastic Renaissance: Art and Culture of the Southern Song.* Taipei: National Palace Museum.

LI, JIAN'AN, CHEN, EN & MING, YONG. [栗建安, 陈恩 & 明勇], 1994. 连江县的几处古窑 Lianjiang Xian De Jichu Guyao. *福建文博 Fujian Wenbo* 2: 74-81.

LI, JIANJUN. [李建军], 1995b. 福建三明地区陶瓷考古综述 Fujian Sanming Diqu Taoci Kaogu Zongshu. *福建文博 Fujian Wenbo* 2: 69-78.

LI, JIANMAO. [李建毛], 1997. 唐, 五代邢, 定窑白瓷在长沙的发现及其对湖南制瓷的影响 Tang, Wudai Xing-Ding Yao Baici Zai Changsha De Faxian Jiqi Dui Hunan Zhici De Yingxiang. *文物春秋 Wenwu Chunqiu* Additional Version: 36-38.

LI, JIAZHI. [李家治], 1978a. 我国瓷器出现时期的研究 Woguo Ciqi Chuxian Shiqi De Yanjiu. *硅酸盐学报 Guisuanyan Xuebao* 3: 190-198.

LI, JIAZHI. [李家治], 1978b. 我国古代陶瓷和瓷器工艺发展过程的研究 Woguo Gudai Taoci He Ciqi Gongyi Fazhan Guocheng De Yanjiu *Kaogu*: 179-188.

LI, JIAZHI. [李家治], 1998. *中国科学技术史 (陶瓷卷) Zhongguo Kexue Jishu Shi (Taoci Juan) [The History of Chinese Science and Tecnology (Volume of Ceramics)]*. Beijing: Kexue Chubanshe.

LI, JINDE. [李德金], 1990. 福建建阳县水吉北宋建窑遗址发掘简报 Fujian Jianyangxian Jishui Beisong Jianyao Yizhi Fajuejianbao. *Kaogu* 12: 1095-1099.

LI, JINGZHOU & LIU, AIYE. [李景洲 & 刘爱叶], 2011. *中国登封窑 Zhongguo Dengfengyao*. Beijing: Wenwu Chubanshe.

LI, JINMING. [李金明], 1996. 唐代中国与阿拉伯的海上贸易 Tangdai Zhongguo Yu Alabo De Haishang Maoyi. *南洋问题研究 Nanyang Wenti Yanjiu* 1: 1-7.

LI, JIUHAI & ZHU, WEIJUN. [李久海 & 朱薇君], 1997. 论扬州出土的一批唐代邢定窑白瓷 Lun Yangzhou Chutu De Yipi Tangdai Xing-Ding Yao Baici. *文物春秋 Wenwu Chunqiu* Addtional Version: 33-43.

LI, JIXIAN. [李继贤], 2011a. 论唐代陶瓷造型艺术 Lun Tangdai Taoci Zaoxing Yishu, in BJYSBWG (ed.) *中国巩义窑 Gongyi Kiln of China*: 260-267. Beijing: Zhongguo Huaqiao Chubanshe.

LI, KANGYING. [李康颖], 1989. 云南禄丰发现元明瓷窑 Yunnan Lufeng Faxian Yuanming Ciyao. *Kaogu* 9: 816-821.

LI, MINJU. [李民举], 1994. 浮梁瓷局与御土窑器 Fuliang Ciju Yu Yutu Yaoqi. *南方文物 Nanfang Wenwu* 3.

LI, SHUOQING. [李硕卿], 1960. 泉州东门外碗窑乡古窑址调查研究情况 Qingzhou Dongmenwai Wanyaoxiang Guyaozhi Diaocha Yanjiu Qingkuang. *泉州海外交通史资料汇编 Quanzhou Haiwai Jiaotongshi Ziliao Huibian* 6.

LI, WEIRAN. [李蔚然], 1962. 南京中华门外明墓清理报告 Nanjing Zhonghuamen Wai Mingmu Qingli Baogao. *Kaogu* 9: 470-478.

LI, YIPING. [李一平], 2006. 景德镇元代瓷窑遗迹概述 Jingdezhen Yuandai Ciyao Yiji Gaishu, *Yuan Qinghua Yanjiu 元青花研究*. Shanghai: Shanghai Cishu Chubanshe.

LI, YONGNING. [李永宁], 2011b. 浙江宁波鄞州栎斜老虎岩窑址发掘简报 Zhejiang Ningbo Yinzhou Lixie Laohuyan Yaozhi Fajue Baogao. *南方文物 Nanfang Wenwu* 1: 71, 75-78.

LI, ZHAO. [李肇], 1987. *国史补 Guo Shi Bu*. Shanghai Guji Chubanshe.

LI, ZHENGQI, SHI, YUNZHENG & LI, LANKE. [李振奇, 史云征 & 李兰珂], 1990. 河北临城七座唐墓 Hebei Lincheng Qizuo Tangmu. *Wenwu* 5: 21-27.

LI, ZHIYAN. [李知宴], 1979b. 浙江象山唐代青瓷窑址调查 Zhejiang Xiangshan Tangdai Qingci Yaozhi Diaocha. *Kaogu*: 435-439.

LI, ZHIYAN. [李知宴], 1985. 从隆化窑的调查看河北陶瓷的发展 Cong Honghuayao De Diaocha Kan Hebei Taoci De Fazhan. *河北陶瓷 Hebei Taoci* 4: 35-40.

LI, ZHIYAN, BOWER, VIRGINIA & HE, LI. 2010b. *Chinese Ceramics from the Paleolithic Period Through the Qing Dynasty*. Yale University Press.

LI, ZUOZHI, LI, ZHIYAN & YU, WENRONG. [李作智, 李知宴 & 于文荣], 1986. 浙江

龙泉青瓷上严儿村窑址发掘报告 Zhejiang Longquan Qingci Shang Yan'er Cun Yaozhi Fajue Baogao. *中国历史文物 Zhongguo Lishi Wenwu*: 43-72.

Liang, Jianlou. [梁建楼], 2005. *井陉历史文化-文物古迹卷 Jingxing Lishi Wenhua-Wenwu Guji Juan*. Beijing: Xinhua Chubanshe.

Liang, Xianhua & Weng, Lianxi. [梁宪华 & 翁连溪], 2008. *中国地方志中的陶瓷史料 Zhongguo Difangzhi Zhongde Taoci Shiliao*. Beijing: Xueyuan Chubanshe Press.

Liebner, Horst 2007. The Siren of Cirebon: Excavation of a 10th Century Trading Vessel Lost in the Java Sea. *In:* A.R. Institute (ed.) *Symposium on Chinese Export Ceramics Trade in Southeast Asia.* Singapore: National Uniersity of Singapore.

Lin, Demin. [林德民], 1999. 泉州东门窑产品及其外销 Quanzhou Dongmenyao Chanpin Jiqi Waixiao. *海交史研究 Haijiaoshi Yanjiu* 2.

Lin, Hong. [林洪], 1965. 河北曲阳县涧磁村定窑遗址调查与试掘 Hebei Quyangxian Jiancicun Dingyao Yizhi Diaocha Yu Shijue. *Kaogu* 8: 394-412.

Lin, Meicun. [林梅村], 2006. *丝绸之路考古十五讲 Sichou Zhilu Kaogu Shiwu Jiang*. Peking University Press.

Lin, Meicun. [林梅村], 2009. 元朝重臣张珪与保定出土元代宫廷酒器 The Powerful Yuan Dynasty Official Zhang Gui and Yuan Dynasty Court Wine Vessels Unearthed in Baoding. *故宫博物院院刊 Gugong Bowuyuan Yuankan*: 24-41.

Lin, Meicun. [林梅村], 2010. 大航海时代东西方文明的冲突与交流——15~ 16 世纪景德镇青花瓷外销调查之一 Dahanghai Shidai Dongxi Fang Wenming De Zhongtu Yu Jiaoliu——15-16 Shiji Jingdezhen Qinghuaci Waixiao Diaocha Zhiyi. *Wenwu* 3.

Lin, Meicun. [林梅村], 2011. *蒙古山水地图 Menggu Shanshui Ditu*. Beijing: Wenwu Chubanshe.

Lin, Meicun. [林梅村], 2012. 波斯湾古港的变迁-2012 年伊朗考察记之一 Bosi Wan Gugang De Bianqian -2012 Nian Yilang Kaochaji Zhiyi *紫禁城 Forbidden City* 4: 24-33.

LIN, MEICUN. [林梅村], 2013. *大朝春秋：蒙元考古与艺术 Dachao Chunqiu: Mengyuan Kaogu Yu Yishu*. Beijing: Gugong Chubanshe Press.

LIN, MEICUN & ZHANG, RAN. 2015. Zheng He's voyages to Hormuz Island: the Archaeological Evdience. *Antiquity* 89: 417-432.

LIN, MEICUN & ZHANG, RAN. in press. The Silk Road: Intercontinental Trade and the Tang Empire, in L.C. NIZIOLEK (ed.) *Cyrus Tang Hall of China: Companion Book.* Chicago: Chicago University Press: Forthcoming.

LIN, SHIMIN. [林士民], 2005a. 宁波东门口码头遗址发掘报告 Waterfront Excavations at Dongmenkou, Ningbo, Zhejiang Province, PRC, in S. LIN (ed.) *再现昔日的文明-东方大港宁波考古研究 Zaixian Xiri De Wenming-Dongfang Dagang Ningbo Kaogu Yanjiu*: 172-211. Shanghai: Shanghai Sanlian Shudian.

LIN, SHIMIN. [林士民], 2005b. 浙江宁波和义路遗址发掘报告 Zhejiang Ningbo Heyilu Yizhi Fajue Baogao, *再现昔日的文明 Zaixian Xiri De Wenming*: 111-147. Shanghai: Shanghai Sanlian Shudian Press.

LIN, ZHONGGAN. [林忠干], 1990. 同安窑系青瓷的初步研究 Tongan Yaoxi Qingci De Chubu Yanjiu. *东南文化 Dongnan Wenhua* 5: 392-397.

LIN, ZHONGGAN & ZHANG, WENYIN. [林忠干 & 张文崟], 1992. 宋元德化窑的分期断代 Songyuan Dehuayao De Fenqi Duandai. *Kaogu*: 559-566.

LIN, ZHONGGAN & ZHAO, HONGZHANG. [林忠干 & 赵洪章], 1984. 福建浦城的宋元瓷窑 Fujian Pucheng De Songyuan Ciyao. *福建文博 Fujian Wenbo* 2: 30-37.

LIU, CHENGJI. [刘成基], 1997. 广东河源东埔古窑址调查 Guangdong Heyuan Dongpu Guyaozhi Diaocha. *南方文物 Nanfang Wenwu* 3: 39-43.

LIU, CHENGJI. [刘成基], 2000. 广东新会官冲古窑址 Gongdong Xinhui Guanchong Gu Yaozhi "An ancient Guanchong kiln site at Xinhui City of Guangdong Province". *Wenwu* 6: 25-43.

LIU, JINFENG. [刘劲峰], 1991. 江西寻乌县上甲村古瓷窑址调查 Jiangxi Xunwuxian Shangjiacun Gu Ciyaozhi Diaocha. *南方文物 Nanfang Wenwu*: 86-93.

LIU, LIN, YU, JIADONG & XU, ZHIFAN. [刘林, 余家栋 & 许智范], 1982. 江西南城明益宣王朱翊鈏夫妇合葬墓 Jiangxi Nancheng Ming Yixuan Wang Zhu Yiyin Fufu Hezang Mu. *Wenwu* 8.

LIU, MAO. [刘茂], 1984. 湘江中、下游地区三处古窑址调查 Xiangjiang Zhong, Xia You Xiqu Sanchu Guyaozhi Diaocha, in W.W.B.J.W.Y.H. 文物编辑委员会 (ed.) *中国古代窑址调查发掘报告集 Zhongguo Gudai Yaozhi Diaocha Fajue Baogao Ji.* Beijing: Wenwu Chubanshe.

LIU, SHANG. [刘昫], 1975. *旧唐书 Jiu Tangshu (Old Tang History)*. Beijing: Zhonghua Shuju.

LIU, TAO & QIAN, GUOXIANG. [刘涛 & 钱国祥], 2009. 北朝的釉陶、青瓷与白瓷 Beichao De Youtao, Qingci Yu Baici, in ZGGTCYJH (ed.) *中国古陶瓷研究 Zhongguo Gutaoci Yanjiu* 41-60. Zijincheng Chubanshe.

LIU, XIN YUAN & BAI, KUN. [刘新园 & 白焜], 1980. 景德镇湖田窑考察纪要 Jingdezhen Hutianyao Kaocha Jiyao. *Wenwu* 11: 39-47.

LIU, XINRU. 1988. Ancient India and Ancient China. *Trade and religious exchange AD 1* 600.

LIU, XINRU. 2010. *The Silk Road in world history*. Oxford University Press.

LIU, XINYUAN. [刘新园], 1974. 景德镇宋，元芒口瓷器与覆烧工艺初步研究 Jingdezhen Song, Yuan Mangkou Ciqi Yu Fushao Gongyi Chubu Yanjiu. *Kaogu* 6: 386-405.

LIU, XINYUAN. [刘新园], 1981a. 蒋祈《陶记》著作时代考辨——兼论景德镇南宋与元代瓷器工艺、市场及税制等方面的差异 RESEARCH ON THE PERIOD OF THE《TAO JI》WRITTEN BY JIANG QI——DISCUSS ABOUT THE DIFFERENCES IN THE PORCELAIN MANUFACTURE TECHNOLOGY,MARKET AND TAXES ETC.BETWEEN SOUTHERN SONG AND YUAN DYNASTY IN JINGDEZHEN. *景德镇陶瓷 Jingdezhen Taoci* 6-35.

LIU, XINYUAN. [刘新园], 1981b. 元代窑事小考 (一)—兼致约翰· 艾惕思爵士 Reserach on Some Problems of Manufacture of Jingdezhen Porcelain in Yuan Period 1-to Sir John Addis. *Taoci Xuebao* 1: 67-78.

LIU, XINYUAN. 1981c. Yuandai Yaoshi Xiaokao 元代窑事小考 (一)——兼致约翰· 艾惕思爵士. *Taoci Xuebao* 1: 008.

LIU, XINYUAN. [刘新园], 1982. 元青花特异纹饰和将作院所属浮梁磁局与画局 Yuan Qinghua Teyi Wenshi He Jiangzuoyuan Suoshu Fuliang Ciju Yu Huaju *Taoci Xuebao* 1: 9-20.

LIU, XINYUAN. [刘新园], 1989. 景德镇明御厂故址出土永乐、宣德官窑瓷器之研究 A Study of Yongle and Dehua Imperial Porcelains Excavated from the Ancient Site of the Ming Dynasty Imperial Factory at Jingdezhen, *景德镇珠山出土永乐宣德官窑瓷器展览 Imperial Porcelain of the Yongle and Xuande Periods Excavated from the Site of the Ming Imperial Factory at Jingdezhen.*: 12-81. Hong Kong: Urban Council.

LIU, XIUPING. [刘秀萍], 2013. 福建宋元时期的青白瓷盒 Fujian Songyuan Shiqi De Qingbai Cihe. *福建文博 Fujian Wenbo* 2: 75-77.

LIU, YAN, QIN, DASHU & KIRIAMA, HERMAN. 2012. 肯尼亚滨海省格迪古城遗址出土中国瓷器 The Chinese Porcelains unearthed at Gedi Ruins in Coast Province, Kenya. *Wenwu* 11: 37-60.

LIU, YANG. [刘洋], 2005. 明代青花瓷的外销 Mingdai Qinghuaci De Waixiao. Unpublished Zhongguo Shehui Kexueyuan Yanjiusheng Yuan：Master‘s Dissertation

LIU, YI. [刘毅], 2002. 论“窑系” Lun "Yaoxi", in ZGGTCYJH (ed.) *中国古陶瓷研究 Zhongguo Gutaoci Yanjiu* 155-166. Beijing: Gugong Chubanshe.

LIU, YINGSHENG. [刘迎胜], 1985. 哈沙尼和他的《完者都史》Hashani He Tade <Wan Zhe Du Shi>. *蒙古学情报与资料 Mengguxue Qingbao Yu Ziliao* 3-4: 103-104.

LIU, YINGSHENG. [刘迎胜], 2011. *海路与陆路: 中古时代东西交流研究 Hailu Yu Lulu: Zhonggu Shidai Dongxi Jiaoliu Yanjiu*. Beijing Daxue Chubanshe.

LIU, YUHEI & XIONG, LIN. [刘裕黑 & 熊琳], 1982. 江西高安县发现元青花, 釉里红等瓷器窖藏 Jiangxi Gao'anxian Faxian Yuan Qinghua, Youlihong Deng Ciqi Jiaocang. *Wenwu* 4: 58-66.

LIU, ZHENQUN. [刘振群], 1978. 窑炉的改进和古陶瓷发展的关系 Yaolu De Gaijin He Gu Taoci Fazhan De Guanxi. *Huanan Gongxueyuan Xuebao* 3: 74-83.

LO, JUNG-PANG. 1955. The Emergence of China as a Sea Power During the Late Sung and Early Yuan Periods. *The Far Eastern Quarterly* 14: 489-503.

LO, JUNG-PANG. 1958. The Decline of the Early Ming Navy. *Oriens Extremus* 5: 149-168.

LO, JUNG-PANG. 2012. *China as a Sea Power 1127-1368*. Hong Kong: Hong Kong University Press.

LONG, FUTING. [龙福廷], 1992. 湖南郴州宋代窑址发掘 Hunan Chenzhou Songdai Yaozhi Fajue. *Kaogu* 9: 831-840.

LOU, JIANLONG. [楼建龙], 1993. 宁德九都扶摇窑址调查简报 Ningde Jiudu Fuyao Yaozhi Diaocha Jianbao. *福建文博 Fujian Wenbo* 21, 22: 168-171.

LU, MINGHUA. [陆明华], 2012. 元青花瓷器综论 Yuan Qinghua Ciqi Zonglun, in S. MUSEUM (ed.) *Splendos in Smalt 幽蓝神采*: 31-54. Shanghai: Shanghai Museum.

LU, YU. [陆羽], 1927. *茶经 The Classic of Tea*. Bai Chuan Xue Hai, Peking University Library.

LUO, PENG. [罗鹏], 2012. 浙江奉化江口长汀山窑址发掘简报 Zhejiang Fenghua Jiangkou Changtingshan Fajue Jianbao. *南方文物 Nanfang Wenwu* 3: 61-65.

LV, CHENGLONG. [吕成龙], 1999. *中国古代颜色釉瓷器 Zhongguo Gudai Yanseyou Ciqi*. Beijing: Zijincheng Chubanshe.

LV, CHENGLONG. [吕成龙], 2004. 元代青花瓷器识鉴 Yuan Dai Qinghua Ciqi Shijian. *故宫博物院院刊 Gugong Bowuyuan Yuankan*: 20-34.

LV, CHENGLONG. [吕成龙], 2008. *明代瓷器鉴定 Mingdai Ciqi Jianding, 2008 国家文物局瓷器鉴定研修班 Ceramic Idenfication Training 2008, State Administration of Cultural Heritage, Beijing. [Unpublished Lecture].*

LV, CHENGLONG. [吕成龙], 2013. 试论钧窑的几个问题 Shilun Junyao De Jige Wenti, in T.P. MUSEUM (ed.) *钧瓷雅集 Junci Yaji*: 330-344. Beijing: Gugong Chubanshe Press.

LV, SIMIAN. [吕思勉], 2005. *隋唐五代史 Sui Tang Wudai Shi [Histories of Sui, Tang and the Five Dynasties]*. Shanghai Guji Chubanshe.

MA, DUANLIN. [马端临], 1936. *文献通考 Wenxian Tongkao*. Shanghai: Wuxishi Bowguguan.

MA, WENKUAN & MENG, FANREN. [马文宽 & 孟凡人], 1987. *中国古瓷在非洲的发现 Zhongguo Guci Zai Feizhou De Faxian*. Zijincheng Chubanshe.

MADSEN, ANDREW D & WHITE, CAROLYN L. 2011. *Chinese export porcelains*. Left Coast Press, Incorporated.

MALLINSON, MICHAEL, SMITH, LAURENCE, BREEN, COLIN, FORSYTHE, WES & PHILLIPS, JACKE. 2009. Ottoman Suakin 1541–1865 AD–Lost & Found.

MATHERS, WILLIAM M. & FLECKER, MICHAEL. 1997. *Archaeological Report: Archaeological Recovery of the Java Sea Wreck*. Pacific Sea Resources.

MATOS, MARIA ANTONIA PINTO DE. 2002/2003. Chinese porcelain in Poruguese Writting Sources. *Oriental Art* Vol. XLVIII.

MCKINNON, E. 1979. A note on the Discovery of Spur-Marked Yueh-Type Sherds at Bukit Seguntang Palembang. *Journal of the Malaysian Branch of the Royal Asiatic Society* 52: 41-47.

MCNEILL, WILLIAM HARDY. 1998. *A World History*. New York: Oxford University Press

MEDLEY, M. 1974. Yuan Porcelain and Stoneware. Faber and Faber.

MEDLEY, MARGARET. 1989. *The Chinese Potter*. Cornell University Press.

MIAO, JIHAO & XUE, ZENGFU. 1984. 河北曲阳北镇发现定窑瓷器 Hebei Quyang Beizhen Faxian Dingyao Ciqi. *Wenwu* 5: 36-38.

MIKAMI, TSUGIO. 1969. *陶磁の道 Ceramic Road*. Tokyo: Iwanami Shuten, Publishers.

MIKAMI, TSUGIO. 1988. Chinese Ceramics from Medieval Sites in Egypt, in H.I.H.P.T. MIKASA (ed.) *Cultural and Economic Relations between East and West*: 8-44. Wiesbanden: Otto Harrassowitz.

MIKSIC, JOHN N. 2004. 14th Century Singapore: A Port of Trade, in J.N.G. MIKSIC, CHERYL-ANN L. M. (ed.) *Early Singapore 1300s-1819, Evidence in Maps,* *Texts and Artefacts*: 41-54. Singapore: Singapore History Museum.

MOORE, EINE. 1970. A suggested classification of stonewares of Martabani type. *Sarawak Museum Journal* 18: 1-78.

MORGAN, DAVID. 1990. *The Mongols*. Cambridge: Wiley-Blackwell.

MORGAN, PETER. 1991. New thoughts on Old Hormuz: Chinese ceramics in the Hormuz region in the thirteenth and fourteenth centuries. *Iran* 29: 67-83.

MORI, T. 2008. 伊朗波斯湾北岸几个海港遗址发现的中国瓷器 Yilang Bosiwan Bei'an Jige Haigang Yizhi Faxiande Zhongguo Ciqi, in ZGGTCYJH (ed.) *中国古陶瓷研究 Zhongguo Gutaoci Yanjiu* 414-434. Zijincheng Chubanshe.

MOTE, FREDERICK W. & TWITCHETT, DENIS 1988. The Cambridge History of China, Volume 7: The Ming Dynasty, 1368–1644, Part 1. Caves Books, Taipei.

MOULE, ARTHUR CHRISTOPHER. 1914. XV. Documents relating to the Mission of the Minor Friars to China in the Thirteenth and Fourteenth Centuries. *Journal of the Royal Asiatic Society of Great Britain & Ireland (New Series)* 46: 533-599.

MQXWHJ & XMDXRLXKGZY. [闽清县文化局 & 厦门大学人类学系考古专业], 1993. 闽清县义窑和青窑调查报告 Minqingxian Yiyao He Qingyao Diaocha Baogao. *福建文博 Fujian Wenbo* 21, 22: 151-160.

MUNOZ, PAUL MICHEL. 2006. *Early kingdoms of the Indonesian Archipelago and the Malay peninsula*. Didier Millet, Csi.

NANJI, RUKSHANA J. . 2011. *Mariners and Merchants: A Study of the Ceramics from Sanjan (Gujarat), BAR International Series 2231*. Archaeopress.

NEBENZAHL, KENNETH. 2004. *Mapping the silk road and beyond*. Phaidon.

NEEDHAM, JOSEPH. 1954. *Introductory Orientations*. (Science and civilisation in China. Cambridge: The Cambridge University Press.

NEELY, JAMES. 1970. 'An Archaeological Reconnaissance of the Deh Luran Plain, 1968–1969. *Iran* 8: 202-203.

NEELY, JAMES. 1974. Sassanian and early Islamic water-control and irrigation systems on the Deh Luran plain, Iran, in T.E. DOWNING & M. GIBSON (eds.) *Irrigation's Impact on Society, Anthropological Papers*: 21-42. Tucson:

Arizona: University of Arizona Press.

NEWTON, LYNNE S 2007. Al Qisha: archaeological investigations at an Islamic period Yemeni village. *Proceedings of the Seminar for Arabian Studies.* JSTOR.

NING, ZHIXIN. [宁志新], 1997. 唐代市舶制度若干问题研究 Tangdai Shibo Zhidu Ruogan Wenti Yanjiu. *中国经济史研究 Zhongguo Jingjishi Yanjiu* 1: 114-121.

NISHITANI, AKIRA. 2012. *Typological Classification and the Chronology of Iron Age pottery in central-southern Britain.* Durham University.

NJSBWG. [南京市博物馆], 1973. 江浦黄悦岭南宋张同之夫妇墓 Jiangpu Huangyueling Nansong Zhangtongzhi Fufu Mu. *Wenwu* 4: 59-66.

NJSBWG. [南京市博物馆], 1984. 江苏宜兴涧滦窑 Jiangsu Yixing Jianzhong Yao, in W.W.B.J.W.Y.H. 文物编辑委员会 (ed.) *中国古代窑址调查发掘报告集 Zhongguo Gudai Yaozhi Diaocha Fajue Baogao Ji*: 51-58. Beijing: Wenwu Chubanshe.

NJSBWG. [南京市博物馆], 2005. 南京市两座明墓的清理简报 Nanjing Shi Liang Zuo Ming Mu De Qingli Jianbao. *华夏考古 Huaxia Kaogu*: 6-13.

NJSBWY. [南京市博物馆], 1976. Nanjing Ming Gugong Chutu Hongwu Shiqi Ciqi 南京明故宫出土洪武时期瓷器. *Wenwu* 8.

ORTON, CLIVE, TYERS, PAUL & VINCE, ALAN. 2010. *Pottery in archaeology*. Cambridge University Press.

OUYANG, XIJUN. [欧阳希君], 2011. <关于早期青花瓷>的谬误. *文物鉴定与鉴赏 Wenwu Jianding Yu Jianshang* 4: 53-59.

PARK, HYUNHEE. 2012. *Mapping the Chinese and Islamic Worlds: Cross-Cultural Exchange in Pre-modern Asia*. Cambridge University Press.

PEARSON, RICHARD. 2007. Early Medieval Trade on Japan's Southern Frontier and its Effect on Okinawan State Development: Grey Stoneware of the East China Sea. *International Journal of Historical Archaeology* 11: 122-151.

PEI, GUANGHUI. [裴光辉], 1999a. 克拉克瓷源流 Kelakeci Yuanliu. *福建文博 Fujian Wenbo* 35: 79-84.

PEI, YAJING. [裴雅静], 1999b. 景德镇青白瓷分期研究 Jingdezhen Qingbaici Fenqi Yanjiu, in ZGGTCYJH (ed.) *中国古陶瓷研究 Zhongguo Gutaoci Yanjiu* 209-221. Beijing: Zijincheng Chubanshe.

PENG, SHIFAN. [彭适凡], 1966. 江西乐平龙南两县发现古窑址 Jiangxi Leping Longnan Liangxian Faxian Guyaozhi. *Kaogu* 5: 260-262.

PIACENTINI, VALERIA FIORANI. 1992. *Merchants-merchandise and Military Power in the Persian Gulf: Suriyanj/Shahriyaj--Siraf*. Accademia Nazionale dei Lincei.

PIERCY, R. C. M., DARROCH, A. & BASS, G. F. 1992. The Wreck of the Santo Antonio de Tanna. *Archaeology* 45: 32-35.

PIERSON, STACEY. 1996. *Earth, Fire and Waters: Chinese Ceramic Technology, A Handbook for Non-specialists*. London: Percival David Foundation of Chinese Art.

PIERSON, STACEY. 2009. *Chinese Ceramics: A Design History*. V&A Publications.

PIERSON, STACEY & MCCAUSLAND, M. 2003. *Song ceramics: objects of admiration*. Percival David Foundation of Chinese Art.

PIRAZZOLI-T'SERSTEVENS, MICHÈLE. 1985. Chinese Ceramics Excavated in Baharain and Oman, *Mikami Tsugio Hakase Kiju Kinen Roubunshu*: 315-335. Tokyo: Ko'Kohen.

PIRAZZOLI-T'SERSTEVENS, MICHÈLE. 1988. La céramique chinoise de Qalʿat al Ṣuḥâr. *Arts asiatiques* 43: 87-105.

PIRAZZOLI-T'SERSTEVENS, MICHÈLE. 2003. *La Céramique Extrême-Orientale a Julfar Dans l'Emirat de Ra'S Al-Khaimah (Xive-Xvie Siecle), Indicateur chronologique, economicque et culturel*. Beijing: Centre de Pekin.

POLO, MARCO. [A.C. MOULE & P. PELLIOT], 1938. *The Descriptioin of the World*. London.

POPE, JOHN ALEXANDER. 1952. *Fourteenth-century Blue-and-white: A Group of Chinese Porcelains in the Topkapu Sarayi Mèuzesi, Istanbul*. Freer Gallery of Art.

POPE, JOHN ALEXANDER. 1956. *Chinese porcelains from the Ardebil Shrine*.

POWER, TIMOTHY. 2015. A Ceramic Chronology for Late Islamic al-Ain, UAE.

Journal of Islamic Material Culture.

PREMATILLEKE, P. L. 1990. Chinese Ceramics Discovered in Sri Lanka- An Overview, in S. BANDARANAYAKE, L. DEWARAJA, R. SILVA & K. WIMALARANTE (eds.) *Sri Lanka and the Silk Road of the Sea*: 233-244. Colombo: Sri Lanka National Commisssion for Unesco and the Central Cultural Fund.

PRICKETT-FERNANDO, MARTHA. 1994. Middlemen and End Users: The Finds of Yue and Longquan Celadons in Sri Lanka, in C. HO (ed.) *New Light on Chinese Yue and Longquan Wares: Archaeological Ceramics Found in Eastern and Southern Asia, A.D. 800-1400*: 299-321. Hongkong: Hongkong University.

PRIESTMAN, SETH. 2005. *Settlement & ceramics in Southern Iran: An analysis of the Sasanian & Islamic periods in the Williamson collection.* Durham University.

PRIESTMAN, SETH. 2013. *A Quantitative Archaeological Analysis of Ceramic Exchange in the Persian Gulf and Western Indian Ocean.* Unpublished Ph.D Thesis, University of Southampton: Southampton.

PRIESTMAN, SETH & KENNET, DEREK. 2002. The Williamson Collection Project: Sasanian and Islamic pottery from Southern Iran. *Iran*: 265-267.

PRINSLOO, LINDA C, WOOD, NIGEL, LOUBSER, MAGGI, VERRYN, SABINE & TILEY, SIAN. 2005. Re-dating of Chinese celadon shards excavated on Mapungubwe Hill, a 13th century Iron Age site in South Africa, using Raman spectroscopy, XRF and XRD. *Journal of Raman Spectroscopy* 36: 806-816.

PTAK, RODERICH. 1999. *China's Seaborne Trade with SOuth and Southeast Asia (1200-1750)*. Sydney: Ashgate Variorum.

QI, TAO. [齐涛], 1999. *中国古代经济史 Zhongguo Gudai Jingjishi*. Shandong Daxue Chubanshe.

QI, XIA. [漆侠], 1987. *宋代经济史 Songdai Jingji Shi*. Shanghai: Shanghai Renmin Chubanshe.

QIAN, GUOXIANG, XIAO, HUAIYAN, GUO, XIAOTAO & LIU, TAO. [钱国祥, 肖淮雁, 郭晓涛 & 刘涛], 2005. 河南洛阳市白马寺唐代窑址发掘简报 Henan Luoyang Baimasi Tangdai Yaozhi Fajue Jianbao. *Kaogu*: 45-54.

QIN, DASHU. [秦大树], 1995. 埃及福斯塔特遗址中发现的中国陶瓷 Aiji Fustate Yizhi Zhong Faxian De Zhongguo Ciqi. *海交史研究 Haijiaoshi Yanjiu*: 79-91.

QIN, DASHU. 2000a. A Study of the Relationship between Cizhou and Ding wares. *TOCS* 65: 2-40.

QIN, DASHU. 2000b. The Success of Cizhou wares during the Jin Dynasty (AD 1115-1234). *TOCS* 65: 25-40.

QIN, DASHU. [秦大树], 2007. 论“窑系”概念的形成，意义及其局限性 Lun "Yaoxi" Gainian De Xingcheng, Yiyi Jiqi Juxianxing "Study on Origin, Significance and Limitation of the Conception-Kiln System". *Wenwu*: 60-66.

QIN, DASHU. [秦大树], 2008. 拾遗南海 补阙中土——谈井里汶沉船的出水瓷器 Shiyi Nanhai Buque Zhongtu- Tan Jingliwen Chenchuan De Chushui Ciqi. *故宫博物院院刊 Gugong Bowuyuan Yuankan*: 91-101.

QIN, DASHU. [秦大树], 2013. 中国古代陶瓷外销的第一个高峰—9~ 10 世纪陶瓷外销的规模和特点 China's First Ceramic Export Trade Peak-Focus on the Volume and Charactics of Ancient Chinese Ceramics Foreign Trade in the 9th and 10th Century. *故宫博物院院刊 Gugong Bowuyuan Yuankan*: 32-49.

QIN, DASHU & GU, YANXUE 2007. 越窑的外销及相关问题 Yueyao De Waixiao Ji Xiangguan Wenti. *In:* Q.H. SHEN (ed.) *中国-越窑高峰论坛论文集 Zhongguo-Yueyao Gaofeng Luntan Lunwenji.* Hangzhou: Wenwu Chubanshe.

QIN, DASHU & LIU, JINGXIAN. [秦大树 & 刘净贤], 2012. 梅清水碧 美艳青瓷 Meiqing Shuibi Meiyan Qingci, *温温玉色照瓷瓯 Wenwen Yuse Zhao Ciou*: 1-29. Beijing: Shoudu Bowuguan Chubanshe.

QIN, DASHU & MA, ZHONGLI. [秦大树 & 马忠理], 1990. 河北省磁县观台磁州窑遗址发掘简报 Hebeisheng Cixian Guantai Cizhouyao Yizhi Fajue Jianbao. *Wenwu* 4: 1-22.

QIU, LICHENG. [邱立诚], 1996. 广东五华县华城屋背岭遗址与龙颈坑窑址 Guangdong Wuhuaxian Huacheng Wubeiling Yizhi Yu Longjingkeng Yaozhi. *Kaogu* 7: 27-40.

QIU, YONGSHENG & XU, XU. [邱永生 & 徐旭], 1993. 江苏徐州大山头元代纪年画像石墓 Jiangsu Xuzhou Dashantou Yuandai Jinian Huaxiang Shimu. *Kaogu* 12: 1094-1098.

QUAN, KUI SHAN. 1999a. 关于唐宋瓷器上的"官"和"新官"字款问题 Guanyu Tang Song Ciqi Shang De "Guan" He "Xin Guan" Zikuan Wenti, *中国古陶瓷研究 Zhongguo Gu Taoci Yanjiu.* Beijing: Zijincheng Chubanshe.

QUAN, KUISHAN. [权奎山], 1999b. 关于唐宋瓷器上的"官"和"新官"字款问题 Guanyu Tangsong Ciqi Shangde "Guan" He "Xinguan" Zikuan Wenti, in ZGGTCYJH (ed.) *中国古陶瓷研究 Zhongguo Gutaoci Yanjiu* Beijing: Zijincheng Chubanshe.

QUAN, KUISHAN. [权奎山], 2003. 试论越窑的衰落 Shilun Yueyao De Shuailuo. *故宫博物院院刊 Gugong Bowuyuan Yuankan*: 49-57.

QUAN, KUISHAN. [权奎山], 2008. 唐五代时期定窑初探 Tang Wudai Shiqi Dingyao Chutan. *故宫博物院院刊 Gugong Bowuyuan Yuankan*: 40-55.

QUAN, KUISHAN & MENG, YUANZHAO. [权奎山 & 孟原召], 2008. *古代陶瓷 Gudai Taoci*. Beijing: Wenwu Chubanshe.

QZSWGH. [衢州市文管会], 1983. 浙江衢州市南宋墓出土器物 Zhejiang Quzhoushi Nansong Mu Chutu Qiwu. *Kaogu* 11: 1004-1018.

RAPHAEL, OSCAR. 1932. Chinese Porcelain Jar in the Treasury of San Marco, Venice. *TOCS* Vol. 10: 13-15.

RATNAYAKE, HEMA. 1984. *Jetavanaramya Project, Anuradhapura: First Archaeological Excavation and Reserach Report (Jan-Jun 1982)*. Colombo: Ministry of Cultural Affairs.

REN, SHILONG & XIE, CHUNLONG. [任世龙 & 谢纯龙], 2002. *越窑瓷鉴定与鉴赏 Yueyaoci Jianding Yu Jianshang*. (名窑名瓷名家鉴赏丛书 Mingyao Mingci Mingjia Jianshang Congshu. Nanchang: Jiangxi Meishu Chubanshe.

RICE, PRUDENCE M. 1987. *Pottery analysis*. University of Chicago Press.

RIDHO, ABU & MACKINNON, W. E. 1998. *The Pulau Buaya Wreck: Finds from the Song Period*. Jakarta: Ceramics Society of Indonesia.

RINALDI, MAURA. 1989. *Kraak porcelain: a moment in the history of trade*. Antique

Collectors Club Limited.

RONG, XINJIANG. [荣新江], 2012. 唐朝与黑衣大食关系史新证 Tangchao Yu Heiyi Dashi Guangxishi Xinzheng. *Wenshi* 文史 3: 231-243.

ROUGEULLE, AXELLE. 1991. Les importations de céramiques chinoises dans le Golfe arabo-persique (VIIIe-XIe siècles). *Archeologie islamique* 2: 5-46.

ROUGEULLE, AXELLE. 1996. Medieval trade networks in the western Indian Ocean (8-14th centuries): some reflections from the distribution pattern of Chinese imports in the Islamic world. *Tradition and Archaeology: Early Maritime Contacts in the Indian Ocean*: 159-80.

ROUGEULLE, AXELLE 2003. Excavations at Sharmah, Hadramawt: the 2001 and 2002 seasons. *Proceedings of the Seminar for Arabian Studies.*

ROUGEULLE, AXELLE 2005. The Sharma horizon: sgraffiato wares and other glazed ceramics of the Indian Ocean trade (c. AD 980–1140). *Proceedings of the Seminar for Arabian Studies.* JSTOR.

SASAKI, TATSUO. 1989. Trade Ceramics from the Coast of the Indian Ocean I. *Journal of East-West Maritime Relations* 1: 117-165.

SASAKI, TATSUO. 1990. EXCAVATIONS AT A'ALI - 1988/89. *Proceedings of the Seminar for Arabian Studies* 20: 111-129.

SASAKI, TATSUO. 1994. Trade Patterns of Zhejiang Ware Found in West Asia, in C. HO (ed.) *New Light on Chinese Yue and Longquan Wares: Archaeological Ceramics Found in Eastern and Southern Asia, AD 800-1400*: 322-332. Hong Kong: The University of Hong Kong.

SASAKI, TATSUO & SASAKI, HANAE. 1992. JAPANESE EXCAVATIONS AT JULFAR: 1988, 1989, 1990 and 1991 SEASONS. *Proceedings of the Seminar for Arabian Studies* 22: 105-120.

SASSOON, HAMO. 1980. Excavations at the site of early Mombasa. *AZANIA: Journal of the British Institute in Eastern Africa* 15: 1-42.

SCANLON, G. T. 1971. The Fustat Mounds: a Shard Count 1968. *Archaeology* 24: 220-233.

SCHEURLEER, DF LUNSINGH. 1974. *Chinese export porcelain*. Pitman Publishing

Corporation.

Schmidt-Colinet, Andreas, Stauffer, Annemarie & As‘ad, Khālid. 2000. *Die Textilien aus Palmyra*. Ph. von Zabern.

Schottenhammer, Angela. 2014. *Yang Liangyaos Reise von 785 n. Chr. zum Kalifen von Bagdad: Eine Mission im Zeichen einer frühen sino-arabischen Mächte-Allianz?* Gossenberg: Ostasien Verlag.

SCSWWGLWYH. [四川省文物管理委员会], 1984. 成都青羊宫窑址发掘简报 Chengdu Qingyanggong Yaozhi Fajue Jianbao. *四川古陶瓷研究 Sichuan Gu Taoci Yanjiu* 2.

SCSWWGLWYH. [四川省文物管理委员会], 1991. 四川邛崃县固驿瓦窑山古瓷窑遗址发掘简报 Sichuan Qionglaixian Guyi Wayaoshan Gu Ciyao Yizhi Fajue Jianbao. *南方民族考古 Nanfang Minzu Kaogu* 3: 341-365.

SCSWWGLWYH, PXWHG. [四川省文物管理委员会 & 彭县文化馆], 1983. 四川彭县磁峰窑址调查记 Sichuan Pengxian Cifeng Yaozhi Diaochaji. *Kaogu* 1: 53-57.

SCSWWKGYJS. [四川省文物考古研究所], 2005. 四川达州市通川区瓷碗铺瓷窑遗址发掘简报 Sichuan Dazhoushi Tongchuanqu Ciwanpu Ciyao Yizhi Fajue Jianbao. *四川文物 Sichuan Wenwu*: 10-22.

SCSWWKGYJS & GYSWWBHGLS. [四川省文物考古研究所 & 广元市文物保护管理所], 2003. 广元市瓷窑铺窑址发掘简报 Guangyuanshi Ciyaopu Yaozhi Fajue Jianbao. *四川文物 Sichuan Wenwu* 3: 3-21.

SDBWG. [首都博物馆], 2012. 温温玉色照瓷瓯 Wenwen Yuse Zhao Ciou, *温温玉色照瓷瓯 Wenwen Yuse Zhao Ciou.* Beijing: Shoudu Bowuguan Chubanshe.

SDDXLSXKGZY & ZZSBWG. [山东大学历史系考古专业 & 枣庄市博物馆], 1989. 山东枣庄中陈郝瓷窑址 Shandong Zaozhuang Zhongchenhao Ciyao Zhi. *Kaogu Xuebao*: 363-386.

SDZBTCSBXZ. [山东淄博陶瓷史编写组], 1978. 山东淄博市淄川区磁村古窑址试掘简报 Shandong Ziboshi Zichuanqu Cicun Guyaozhi Shijue Jianbao. *Wenwu* 6: 46-55.

SDZBTCSBXZ. [山东淄博陶瓷史编写组], 1984. 山东淄博寨里北朝青瓷窑址调查纪要 Shangdong Zibo Zhaili Beichao QIngci Yaozhi Diaocha Jiyao, in W.W.B.J.W.Y.H. 文物编辑委员会 (ed.) *中国古代窑址调查发掘报告集 Zhongguo Gudai Yaozhi Diaocha Fajue Baogao Ji*: 352-359. Beijing: Wenwu Chubanshe.

SEN, TANSEN. 2006. The Yuan Khanate and India: Cross-Cultural Diplomacy in the Thirteenth and Fourteenth Centuries. *Asia Major*: 299-326.

SHBWG. [上海博物馆], 1982. 上海青浦县元代任氏墓葬记述 Shanghai Qingpuxian Yuandai Renshi Muzang Jishu. *Wenwu* 7: 54-59.

SHBWG. [上海博物馆], 2012. *Splendos in Smalt 幽蓝神采*. Shanghai: Shanghai Museum.

SHBWGKGB. [上海博物馆考古部], 1986. 浙江龙泉安仁口古瓷窑址发掘报告 Zhejiang Longquan Anrenkou Guci Yaozhi Fajue Baogao. *上海博物馆集刊 Shanghai Bowuguan Jikan* 3: 102-132.

SHEN, QIONGHUA. [沈琼华], 2009. 原始青瓷与古越文明 Yuanshi Qingci Yu Gu Yue Wenming, in Q.H. SHEN (ed.) *瓷之源 Ci Zhi Yuan* 10-13. Hangzhou: Zhejiangsheng Bowuguan Chubanshe.

SHEN, QIONGHUA. [沈琼华], 2012. *大元帆影: 韩国新安沉船出水文物精华 Sailing from the Great Yuan Dynasty: Relics Excavated from the Sinan Shipwreck*. Beijing: Wenwu Chubanshe Press.

SHEN, YUEMING. [沈岳明], 2008. 越窑的发展及井里汶沉船的越窑瓷器 Yueyao De Fazhan Ji Jingliwen Chenchuan De Yueyao Ciqi. *故宫博物院院刊 Gugong Bowuyuan Yuankan*: 102-106.

SHEN, YUEMING. [沈岳明], 2010. "官窑" 三题 "Guan Yao" San Ti. *故宫博物院院刊 Gugong Bowuyuan Yuankan*: 16-25.

SHENG, DINGGUO. [盛定国], 1983. 湖南益阳县羊午岭古窑址调查 Hunan Yiyangxian Yangwuling Guyaozhi Diaocha. *Kaogu* 4: 334-342.

SHENNAN, STEPHEN. 1997. *Quantifying archaeology*. University of Iowa Press.

SHEPARD, A. O. 1956. *Ceramics for the Archaeologist*. (Washington. Carnegie Institute of Washington.

SHERRATT, SUSAN 1999. " E pur si muove": pots, markets and values in the second millenium Mediterranean. *In:* C.A.C.O.M.A.G.P.T.T.E.T.C.B. THE COMPLEX PAST OF POTTERY: PRODUCTION (ed.) *Processdings of the ARCHON international conference, 8-9 November 1996.* Amsterdam: J. C. Gieben Publisher.

SHI, CONGJI, LI, JUN, LI, ENWEI & WANG, RUI. [石从枝, 李军, 李恩玮 & 王睿], 2006. *邢台隋代邢窑 Xingtai Suidai Xingyao*. Beijing: Kexue Chubanshe 科学出版社.

SHI, GU. [石古], 1984. 全南县渡田坑古窑址的调查 Quan'nan Xian Dutiankeng Gu Yaozhi De Diaocha. *江西历史文物 Jiangxi Lishi Wenwu* 2: 62-63.

SHI, YONGSHI. [石永士], 1988. 河北易县北韩村唐墓 Tang Tombs found at Bei Han Village of Yixian County in Hebei Province. *Wenwu* 4: 66-70.

SINOPOLI, CARLA M. 1991. *Approaches to archaeological ceramics*. Springer.

SMART, ELLEN S. 1977. Fourteenth century Chinese porcelain from a Tughlaq palace in Delhi. *Transactions of the Oriental Ceramic Society* 41: 199-230.

SONG, BAICHUAN & LIU, FENGJUN. [宋百川 & 刘凤君], 1985. 山东曲阜、泗水隋唐瓷窑址调查 Shandong Qufu, Sishui Sui Tang Ciyao Zhi Diaocha. *Kaogu* 1: 33-41.

SONG, LIAN. [宋濂], 1984. Yuanshi 元史 （History of Yuan）, in J. ZHU (ed.) *Yingjing Wenyuange Siku Quanshu 印景文渊阁四库全书.* Taiwan: Taiwan Shangwu Yinshuguan Gongsi.

SONG, LIANGBI. [宋良壁], 1991. 广东的宋元彩绘瓷器 Guangdong De Songyuan Caihui Ciqi. *江西文物 Jiangxi Wenwu* 3: 51-55.

STAUFFER, ANNEMARIE 1996. Textiles from Palmyra: Local Production and the Import and Imitation of Chinese Silk Weavings. Directorate-General of Antiquities and Museums.

STEENSGAARD, NIELS. 1974. *The Asian trade revolution of the seventeenth century: the East India Companies and the decline of the caravan trade*. University of Chicago Press Chicago.

SUBBARAYALU, Y. 1996. Chinese ceramics of Tamilnadu and Kerala coasts. *Tradition* *and Archaeology*: 109-114.

SUN, LI. [孙莉], 2004. 萨珊银币在中国的分布及其功能 Distribution of Sassanian Silver Coins and Their Functions in China. *Kaogu Xuebao* 1: 35-54.

SUN, XINMIN. [孙新民], 2005. 河南宝丰清凉寺汝窑址发掘的主要收获 Henan Baofeng Qingliangsi Ruyaozhi Fajue De Zhuyao Shouhuo. *南方文物 Nanfang Wenwu*: 1-3.

SUN, YINGZHOU. [孙瀛洲], 1966. 元明清瓷器的鉴定 (续) Yuan Ming Qing Ciqi De Jianding (Xu) *Wenwu* 3: 48-58.

SXBWG. [沙县博物馆], 2011. 沙县水南鸡金山宋代窑址调查简报 Shaxian Shuinan Jinjishan Songdai Yaozhi Diaocha Jianbao. *福建文博 Fujian Wenbo* 3: 15-20.

SXSBWG & LQXWJJ. [陕西省博物馆 & 礼泉县文教局], 1972. 唐郑仁泰墓发掘简报 Tang Zheng Rentai Mu Fajue Jianbao. *Wenwu* 7: 33-41.

SXSKGYJS. [陕西省考古研究所], 1965. *陕西铜川耀州窑 Shanxi （Shaanxi） Tongchuan Yaozhou Yao* Beijing: Kexue Chubanshe.

SXSKGYJS. [陕西省考古研究所], 1998. 山西长治八义窑试掘报告 Shanxi Changzhi Bayi Yao Shijue Baogao. *文物季刊 Wenwu Jikan* 3: 3-24.

SXSKGYJS. [陕西省考古研究所], 1999. 山西盂县古瓷窑(磁窑坡窑)遗址调查简报 Shanxi Yuxian Guciyao (Ciyaopo Yao) Yizhi Diaocha Jianbao. *文物季刊 Wenwu Jikan* 2: 11-21.

SXSKGYJS & YZYBWG. [陕西省考古研究所 & 耀州窑博物馆], 1998. *宋代耀州窑址 Songdai Yaozhou Yaozhi*. Beijing: Wenwu Chubanshe.

T'IEN, JU-KANG. 1981. Chêng Ho's Voyages and the Distribution of Pepper in China. *Journal of the Royal Asiatic Society of Great Britain and Ireland*: 186-197.

TAHA, ADI BIN HAJI. 1983. Recent archaeological discoveries in Peninsular Malaysia 1976-1982. *Journal of the Malaysian Branch of the Royal Asiatic Society*: 47-63.

TAMPOE, M. 1989. *Maritime Trade between China and the West, BAR Series 555*. Oxford.

TANG, YUXIAN. [汤毓贤], 1999. 福建云霄火田水头窑调查 Fujian Yunxiao Huotian Shuitou Yao Diaocha. *福建文博 Fujian Wenbo* 35: 144-148.

TAO, FUHAI. [陶富海], 1992. 山西霍州市陈村瓷窑址的调查 Shanxi Huozhoushi Chencun Yaozhi De Diaocha. *Kaogu* 6: 522-525.

TAO, ZHIQIANG. [陶治强], 2011. 简论隋唐时期寿州窑的发展 Jianlun Suitang Shiqi Shouzhou Yao De Fa Zhan. *文物春秋 Wenwu Chunqiu*: 39-44.

THACKSTON, WHEELER MCINTOSH. 2001. *Album prefaces and other documents on the history of calligraphers and painters*. Brill.

TIRTAMARTA, ADI AGUNG. 2007. 井里汶海底十世纪沉船打捞纪实 The Record of the Excavation of Cirebon Shipwreck of the 10 Century. *故宫博物院院刊 Gugong Bowuyuan Yuankan* 2007: 151-154.

TJIOCA & TFPSM. [T.J.I.O.C. ARCHAEOLOGY & T.F.P.S. MUSEUM], 1992. *Ceramic finds from Jingdezhen Kilns*. Hong Kong: Hong Kong University & Feng Pingshan Museum.

TONG, JIAZHOU. [童家洲], 1980. 试论宋元泉州港繁盛的原因 Shilun Songyuan Quanzhou Gang Fansheng De Yuanyin. *文史哲 Wen Shi Zhe* 4: 57-64.

TRIPATI, SILA, PANDE, ROHINI & RAO, V. GOPALA. 2011. Study of Chinese Porcelain Sherds of Old Goa, India: Indicators of Trade Contacts. *Man and Environment* XXXVI: 107-116.

TUFTE, EDWARD R. 1991. Envisioning information. *Optometry & Vision Science* 68: 322-324.

TUFTE, EDWARD R & GRAVES-MORRIS, PR. 1983. *The visual display of quantitative information*. series 9). Graphics press Cheshire, CT.

TWITCHETT, DENIS & MOTE, FREDERICK. 1998. *The Cambridge History of China. Vol. 8: The Ming Dynasty 1368-1644 Part 2*. Cambridge: Cambridge University Press.

TWITCHETT, DENIS & FAIRBANK, JOHN KING. 2007. *The Cambridge History of China, Volume 3, Sui and T'ang China, 587-960, Part I*. Cambridge: Cambridge University Press.

TWITCHETT, DENIS & SMITH, PAUL JAKOV. 2009. *The Sung Dynasty and its* *precursors, 907-1279*. (The Cambridge History of China. New York: Cambridge University.

VAINKER, SHELAGH. 1991. *Chinese pottery and porcelain: from prehistory to the present*. Trustees of the British Museum.

VALDERS, C. O. 2000. Stoneware Jars and Potters in Southeast Asia. *Arts of Asia* 30: 74-81.

VAN DER PIJL-KETEL, CHRISTINE. 1982. *The Ceramic Load of the Witte Leeuw 1613*. Amsterdam: Rijks Museum.

WAN, YOUNAN. [万幼楠], 1987. 江西于都东坑，窑塘古窑址调查 Jiangxi Yudu Dongkeng, Yaotang Gu Yaozhi Diaocha. *Kaogu*: 542-545.

WANG, BANGWEI. [王邦维], 1988. *大唐西域求法高僧传校注 Da Tang Xiyu Qiufa Gaoseng Zhuan Jiaozhu*. Beijing: Zhonghua Shuju Press.

WANG, DAYUAN. [汪大渊], 1981. *Daoyi Zhilue 岛夷志略 circa 1349*. Beijing: Zhonghua Shuju Press.

WANG, DEHENG. [王德恒], 2004a. 2003 年全国十大考古新发现之五——集宁路的元代瓷器大发现 2003 Nian Quanguo Shida Kaogu Xinfaxian Zhiwu-Jininglu De Yuandai Ciqi Dafaxian. *知识就是力量 Zhishi Jiushi Liliang* 11.

WANG, GUANGYAO. [王光尧], 2004b. 关于青花起源的思考 Guanyu Qinghua Qiyuan De Sikao. *故宫博物院院刊 Gugong Bowuyuan Yuankan*: 58-64.

WANG, GUANGYAO. [王光尧], 2004c. *中国古代官窑制度 Zhongguo Gudai Guanyao Zhidu*. 紫禁城出版社 Zijincheng Chubanshe.

WANG, GUANGYAO. [王光尧], 2011a. 对中国古代输出瓷器的一些认识 Dui Zhongguo Gudai Shuchu Ciqi De Yixie Renshi. *故宫博物院院刊 Gugong Bowuyuan Yuankan*: 36-54.

WANG, GUANGYAO. [王光尧], 2011b. *明代宫廷陶瓷史 Mingdai Gongting Taoci Shi*. Beijing: Zijincheng Chubanshe.

WANG, GUANGYAO. [王光尧], 2011c. 再论御器厂的建立时间——明代御窑窑址的考古学分期 Zai Lun Yuqichang De Jianli Shijian-Mingdai Yuyao Yizhi De Kaoguxue Fenqi. *Nanfang Wenwu* 4: 28-32.

WANG, GUANGYAO. [王光尧], 2014a. A Discussion of the Dusun and Martabani wares, Wang Guangyao's visit to Durham University [personal communication].

WANG, GUANGYAO, WANG, SHANGHAI & JIANG, JIANXIN. [王光尧, 王上海 & 江建新], 2006. 景德镇市丽阳元明瓷窑址 Jingdezhen Liyang Yuan Ming Ciyaozhi. *中国考古学年鉴 Zhongguo Kaoguxue Nianjian*: 235-237.

WANG, GUNGWU. 1970. 'Public' and 'Private' Overseas Trade in Chinese History, in M. MOLLAT (ed.) *Sociétés et compagnies de commerce en Orient et dans l'Océan Indien*: 215-225. Paris: S. E. V. P. E. N.

WANG, JIANBAO. [王建保], 2010. 磁州窑窑址考察与初步研究 Cizhou Yao Yaozhi Kaocha yu Chubu Yanjiu, in ZGGTCYJH (ed.) *中国古陶瓷研究 Zhongguo Gutaoci Yanjiu* 7-16. Beijing: Zijincheng Chubanshe.

WANG, JIANBAO. [王建保], 2014b. *RE: Identification of Chinese Ceramics: based on exmainations of the Williamson Collections.*

WANG, LIBIN. [王立斌], 1986. 江西铅山县发现几处古瓷窑址 Jiangxi Yanshanxian Faxiande Jichu Guci Yaozhi. *Kaogu* 11: 1047-1048.

WANG, NING. [汪柠], 2014c. *景德镇东郊兰田窑的发掘及其断代研究 Jingdezhen Dongjiao Lantian Yao De Fajue Jiqi Duandai Yanjiu.* 景德镇陶瓷学院 Jingdezhen Taoci Xueyuan.

WANG, WENJING. [王文径], 1993. 福建漳浦县赤土古窑址调查 Fujian Zhangpuxian Chitu Guyaozhi Diaocha. *Kaogu* 3: 248-253.

WANG, YINQING. [王胤卿], 2001. 有关"官"字款瓷器中"官"字涵义的探讨 Youguan "Guan" Zi Kuan Ciqi Zhong "Guan" Zi Hanyi De Tantao. *历史教学问题 Lishi Jiaoxue Wenti*: 42-43.

WEBER, MAX. 1964. *The Religion of China: Confucianism and Taoism*. New York: The Free Press.

WEI, BENFENG. [卫本峰], 1986. 安阳县古瓷窑遗址考察 Anyang Xian Guciyao Yizhi Kaocha. *中原文物 Zhongyuan Wenwu* 3: 50-52.

WEI, MINGKONG. [魏明孔], 1999. 隋唐手工业与我国经济重心的南北易位 Sui

Tang Shougongye Yu Woguo Jingji Zhongxin De Nan Bei Yiwei. *中国经济史研究 Zhongguo Jingjishi Yanjiu* 2: 49-58.

WEI, RENYI. [韦仁义], 1984. 广西藤县宋代中和窑 Guangxi Tengxian Songdai Zhonghe Yao, in 文.W.W.B.J.W.Y. HUI (ed.) *中国古代窑址调查发掘报告集 Zhongguo Gudai Yaozhi Diaocha Fajue Baogao Ji*: 179-194. Beijing: Wenwu Chubanshe.

WEN, SONGQUAN, LI, JIAN'AN, YANG, ZELIN, WANG, FANG, LIAO, FUKUI, LAN, XIU, HE, QI, REN, RUIBO, WEI, CHANGFU & HUA, FENGLIN. [温松全, 栗建安, 羊泽林, 王芳, 廖富魁, 蓝秀, 和奇, 任瑞波, 危长福, 华锋林 & 郑辉], 2011. 闽侯县碗窑山窑址 Y2, Y3 发掘简报 Minhou Xian Wanyaoshan Yaozhi Y2, Y3 Fajue Jianbao. *福建文博 Fujian Wenbo* 4: 22-27.

WENKE, ROBERT JOHN. 1975-76. Imperial investments and agricultural developments in Parthian and Sassanian Khuzestan: 150 BC to AD 640. *Dissertation abstracts international. A. The humanities and social sciences* 36.

WHALEN, N., KILLICK, A., JAMES, N., MORSI, G. & KAMAL, M. 1981. Preliminary Report on the Western Province Survey. *Atlal* 5: 43-58.

WHITCOMB, DONALD S. 1983. QUSEIR al-QADIM: A PORT ON THE EGYPTIAN COAST OF THE RED SEA. *Proceedings of the Seminar for Arabian Studies* 13: 103-105.

WHITCOMB, DONALD S. 1988. Islamic archaeology in Aden and the Hadhramaut, in D.T. POTTS (ed.) *Araby the Blest: Studies in Arabian Archaeology*: 177-263. Copenhagen: Museum Tusculanum Press.

WHITEHOUSE, DAVID. 1968. Excavations at Sīrāf; First Interim Report. *Iran* 6: 1-22.

WHITEHOUSE, DAVID. 1969. Excavations at Sīrāf: Second Interim Report. *Iran* 7: 39-62.

WHITEHOUSE, DAVID. 1970. Excavations at Sīrāf: Third Interim Report. *Iran* 8: 1-18.

WHITEHOUSE, DAVID. 1971. Excavations at Sīrāf: Fourth Interim Report. *Iran* 9: 1-17.

WHITEHOUSE, DAVID. 1972a. Chinese Porcelain in Medieval Europe. *Medieval Archaeology* 16: 63-78.

WHITEHOUSE, DAVID. 1972b. Excavations at Sīrāf: Fifth Interim Report. *Iran* 10:

63-87.

WHITEHOUSE, DAVID 1973. Chinese stoneware from Siraf: the earliest finds. *South Asian Archaeology. Papers from the first international conference of South Asian archaeologists held in the University of Cambridge. London.*

WHITEHOUSE, DAVID. 1974. Excavations at Sīrāf: Sixth Interim Report. *Iran* 12: 1-30.

WHITEHOUSE, DAVID 1975. The decline of Siraf. *In:* F. BAGHERZADEH (ed.) *Proceedings of the Annual Symposium on Archaeological Research in Iran.* Tehran.

WHITEHOUSE, DAVID. 1979. Islamic glazed pottery in Iraq and the Persian Gulf: the ninth and tenth centuries. *Annali. Istituto Orientale di Napoli Roma* 39: 45-61.

WHITEHOUSE, DAVID. 1983. Maritime trade in the Gulf: The 11th and 12th centuries. *World Archaeology* 14: 328-334.

WHITEHOUSE, DAVID & WILLIAMSON, ANDREW. 1973. Sasanian maritime trade. *Iran*: 29-49.

WHSWWC. [武汉市文物处], 1984. 武汉市武昌县湖泗窑址的初步调查 Wuhanshi Wuchangxian Husi Yaozhi De Chubu Diaocha, in W.W.B.J.W.Y.H. 文物编辑委员会 (ed.) *中国古代窑址调查发掘报告集 Zhongguo Gudai Yaozhi Diaocha Fajue Baogao Ji*: 273-274. Beijing: Wenwu Chubanshe.

WIESNER, ULRICH. 1979. *Chinesische Keramik auf Hormoz: Spuren einer Handelsmetropole im Persischen Golf*. Museum für Ostasiatische Kunst.

WILLETTS, W. 1960. Excavations at Bhambore near Karachi. *Oriental Art* 6: 25-28.

WILLETTS, WILLIAM Y & LIM, SUAN POH. 1981. *Nonya Ware and Kitchen Ch'ing: Ceremonial and Domestic Pottery of the 19th-20th Centuries Commonly Found in Malaysia*. Southeast Asian Ceramic Society, West Malaysia Chapter.

WILLIAMSON, ANDREW. 1973. Hurmuz and the Trade of the Gulf in the 14th and 15th Centuries AD. *Proceedings of the Seminar for Arabian Studies* 3: 52-68.

WILLIAMSON, ANDREW 1974. Harvard archaeological survey in Oman, 1973: III-Sohar and the sea trade of Oman in the tenth century AD. *Proceedings of the Seminar for Arabian Studies.* JSTOR.

WILSON, J. KEITH & FLECKER, MICHAEL. 2010. Dating the Belitung Shipwreck, in R. KRAHL, J. GUY, J.K. WILSON & J. RABY (eds.) *Shipwrecked: Tang Treasures and Monsoon Winds*: 35-44. Singapore: Arthur M. Sackler Gallery, Smithsonian Institution.

WINK, ANDRÉ. 1990. Al Hind: The Making of the Indo Islamic World. Volume 1 Early Medieval India and the Expansion of Islam. *Leiden: Brill*.

WU, LIANCHENG. [吴连城], 1958. 山西介休洪山镇宋代瓷窑址介绍 Shanxi Jiexiu Hongshanzhen Songdai Ciyao Jieshao. *Wenwu* 10: 36-37.

WU, XIAOBIN & DA, HAOBO. [吴孝斌 & 笪浩波], 2003. 广东曲江白土下乡宋窑发掘简报 Guangdong Qujiang Baitu Xiaxiang Songyao Fajue Baogao. *江汉考古 Jianghan Kaogu* 89: 18-24.

WU, YONGCUN. [吴水存], 1984. "延祐器"与"至正型产品"纹饰对比初探 Yanyou Qi Yu Zhizheng Xing Chanpin Wenshi Duibi Chutan. *Zhongguo Taoci* 5: 30-38.

XIA, JINRUI. [夏金瑞], 1984. 大余县壶头山唐窑 Dayuxian Hutoushan Tangyao. *江西历史文物 Jiangxi Lishi Wenwu* 2: 59-60.

XIA, NAI. [夏鼐], 1974. 综述中国出土的波斯萨珊银币 Zongshu Zhongguo Chutu De bosi Sashan Yinbi. *Kaogu Xuebao* 1.

XIANG, XINMIN. [向新民], 1996. 湖南衡阳市蒋家窑址的再调查 Hunan Hengyang Shi Jiangjia Yaozhi De Zai Diaocha. *Kaogu* 6: 37-40, 94.

XIAO, MENGLONG. [肖梦龙], 1982. 宜兴小窑墩晋、唐窑址的调查报告 Yixing Xiaoyaodun Jin, Tang Yaozhi De Diaocha Baogao. *中国陶瓷 Zhongguo Taoci* 7 Addtional Version: 25-33.

XIE, DAOHUA. [谢道华], 1996. 福建建阳炉坪山窑址调查记 Fujian Jianyang Lupingshan Yaozhi Diaochaji. *南方文物 Nanfang Wenwu* 2: 17-20.

XIE, LING. [谢玲], 2000. 广西柳江县里雍乡宋代瓷窑遗址 Guangxi Liujiangxian Liyongxiang Songdai Ciyao Yizhi. *南方文物 Nanfang Wenwu* 3: 23-25.

XIONG, HAITANG. [熊海堂], 1995. *东亚窑业技术发展与交流史研究 Dongya Yaoye Jishu Fazhan Yu Jiaoliu Shi Yanjiu (A Study of Ceramic Manufacturing Tecnique and Communication History in Eastern Asia)*. Nanjing: Nanjing

University Press.

XIONG, LIAO. [熊廖], 1993. *中国陶瓷美术史 Zhongguo Taoci Meishu Shi*. Beijing: Zijincheng Chubanshe.

XIONG, LIAO. [熊廖], 2006a. 克拉克瓷研究 Kelake Ci Yanjiu. *故宫博物院院刊 Gugong Bowuyuan Yuankan* 3: 113-122.

XIONG, LIAO. [熊廖], 2006b. *中国陶瓷古籍集成 Zhongguo Taoci Guji Jicheng*. Shanghai Wenhua Chubanshe.

XIONG, YUEQUAN & HE, SHIWEI. [熊跃泉 & 贺世伟], 1997. 湖泗窑初探 Husi Yao Chutan, in ZGGTCYJH (ed.) *中国古陶瓷研究 Zhongguo Gutaoci Yanjiu* 219-225. Beijing: Zijincheng Chubanshe.

XMSWWGLWYH. [厦门市文物管理委员会], 1999. 厦门海沧宋代窑址发掘简报 Xiamen Haicang Songdai Yaozhi Fajue Jianbao. *南方文物 Nanfang Wenwu* 2: 11-22.

XU, DIANKUI. [徐殿魁], 1996. 河南堰师市杏园村唐墓的发掘 Henan Yanshishi Xingyuancun Tangmu De Fajue. *Kaogu* 12: 1-24.

XU, PU, LI, DONGYANG & SHEN, SHIXING. [徐溥, 李东阳 & 申时行], 1976. *大明会典 Daming Huidian*. Taiwan: Xin Wen Feng Press.

XU, SONG. [徐松], 1957. *宋会要辑稿 Draft Recovered Edition of the Song Huiyao*. Beijing: Zhonghua Shuju Press.

XUE, DONGXING & ZUO, ZHENXI. [薛东星 & 禚振西], 2002. 陕西铜川陈炉地区瓷窑遗址考古调查的新发现 Shanxi Tongchuan Chenlu Duqu Ciyao Yizhi Kaogu Diaocha De Xin Faxian, in ZGGTCYJH (ed.) *中国古陶瓷研究 Zhongguo Gutaoci Yanjiu* Beijing: Zijincheng Chubanshe.

XUE, JUZHENG. [薛居正], 1997. *旧五代史 Jiu Wudai Shi [The Old History of the Five Dynasties]* Zhonghua Shuju Press.

XUE, QIAO & LIU, JINFENG. [薛翘 & 刘劲峰], 1996. 江西全南县渡田坑, 梅子山窑址调查 Jiangxi Quan'nan Xian Dutiankeng, Meizishan Yaozhi Diaocha. *南方文物 Nanfang Wenwu* 2.

XUE, QIAO & LUO, XING. [薛翘 & 罗星], 1983. 明代赣县瓷窑及其外销琉球产品

的调查记略 Mingdai Ganxian Ciyao Jiqi Waixiao Liuqiu Chanpin De Diaocha Jilue. *江西历史文物 Jiangxi Lishi Wenwu* 2: 50-53.

XUE, YAO. [薛尧], 1965. 江西南城，清江和永修的宋墓 Jiangxi Nancheng, Qingjiang He Yongxiu De Song Mu. *Kaogu* 11.

XWXWWPCD. [寻乌县文物普查队], 1984. 寻乌县上甲村发现宋代窑群 Xunwuxian Shangjiacun Faxian Songdai Yaoqun. *江西历史文物 Jiangxi Lishi Wenwu* 2: 61-62.

XYDQWWGLWYH. [咸陽地區文物管理委員會], 1980. 旬邑安仁古瓷窑遗址发掘简报 Xunyi Anren Guciyao Yizhi Fajue Jianbao. *考古与文物 Kaogu Yu Wenwu* 3.

XYXBWG. [仙游县博物馆], 1999. 福建仙游古窑址调查 Fujian Xianyou Guyaozhi Diaocha. *福建文博 Fujian Wenbo* 35: 149-152, 165.

YAJIMA, HIKOICHI. 1980. Some Aspects of the Egyptian Commercial Policy in the Bahri Mamluk Period. *Journal of Asian and African Studies* 20: 41-61.

YANG, CONG. [杨琮], 1990. 建阳将口唐窑发掘简报 Jianyang Jiankou Tangyao Fajue Jianbap. *东南文化 Dongnan Wenhua* 3: 135-141.

YANG, GUANFU. [杨冠富], 2011. *河滨遗范 Hebin Yifan*. Hangzhou: Zhejiang Guji Chubanshe Press 浙江古籍出版社.

YANG, GUIJIN. [杨贵金], 1997. 当阳峪窑新探 Dangyangyu Yao Xintan. *文物春秋 Wenwu Chunqiu* 1: 160-164.

YANG, HAO. [杨豪], 1956. 广东梅县大墓岌晋、唐墓清理简报 Guangdong Meixian Damuji Jin, Tang Mu Qingli Jianbao. *考古通讯 Kaogu Tongxun* 5: 27-31.

YANG, HOULI. [杨后礼], 1981. 永新县发现元代瓷器 Yongxin Xian Faxian Yuandai Ciqi. *南方文物 Nanfang Wenwu* 2.

YANG, HOULI. [杨后礼], 1983. Jiangxi Mingdai Jinianmu Chutu De Qinghua Ciqi. *Jiangxi Lishi Wenwu* 3: 85-95.

YANG, HOULI & WAN, LIANGTIAN. [杨后礼 & 万良田], 1981. 江西丰城县发现元代纪年青花釉里红瓷器 Jiangxi Fengcheng Xian Faxian Yuandai Jinian Qinghua Youlihong Ciqi. *Wenwu* 11: 72-74.

YANG, SHAOXIANG. [杨少祥], 1985. 广东唐至宋代陶瓷对外贸易略述 A Brief Account of Ceramic Exports from Guangdong During the Tang and Song Dynasties, in FPSM (ed.) *广东 唐宋窑址出土陶瓷 Ceramic Finds from Tang and Song Kilns in Guangdong*: 22-31. Hongkong: Fung Ping Shan Museum.

YANG, SHAOXIANG. [杨少祥], 1988. 海康县公益村、土圹村宋元窑址 Haikangxian Gongyicun, Tukuangcun Songyuan Yaozhi, *中国考古学年鉴 1987 Zhongguo Kaoguxue Nianjian 1987*: 228-229. Beijing: Wenwu Chubanshe.

YANG, SHAOXIANG. [杨少祥], 1994. 广东梅县市唐宋窑址 Guangdong Meixian Shi Tang Song Yaozhi. *Kaogu* 3: 231-238.

YANG, SHAOXIANG & CUI, YONG. [杨少祥 & 崔勇], 1993. 广东高明唐代窑址发掘简报 Guangdong Gaoming Tangdai Taozhi Fajue Jianbao. *Kaogu* 9: 809-814.

YANG, WENSHAN & LIN, YUSHAN. [杨文山 & 林玉山], 1981. 唐代邢窑遗址调查报告 Tangdai Xingyao Yizhi Diaocha Baogao. *Wenwu* 9: 37-40, 45.

YANG, WENSHAN & ZHAO, HONGSHENG. [杨文山 & 赵鸿声], 1993. 邢窑的沉浮 Xingyao De Chenfu. *河北陶瓷 Hebei Taoci* 1: 34-38.

YANG, XIAODONG. [杨晓东], 2001. 雷州窑青瓷褐釉彩瓷的特征及其年代 Leizhou Yao Qingyou Hecai Ci De Tezheng Jiqi Niandai. *南方文物 Nanfang Wenwu* 3: 66-71.

YANG, YUZHANG, ZHANG, JUZHONG, LI, GUANGNING & XU, FAN. [杨玉璋, 张居中, 李广宁 & 徐繁], 2006. 安徽繁昌县柯家冲瓷窑遗址发掘简报 Anhui Fanchang Xian Kejiachong Ciyao Yizhi Fajue Jianbao. *Kaogu* 4: 37-48.

YANG, ZHIRONG. [杨芝荣], 1964. 孟家井瓷窑遗址 Mengjiajing Ciyao Yizhi. *Wenwu* 9: 46-51.

YANG, ZONGLIN. [楊宗霖], 2009. 兩宋海上貿易的發展與轉折-從廣州到泉州的考察 Liangsong Haishang Maoyi De Fazhan Yu Zhuanzhe-Cong Guangzhou Dao Quanzhou De Kaocha. *暨南史學 Jinan Shixue*: 235-290.

YE, LINZHI. [叶麟趾], 1934. *古今中外陶瓷汇编 Gujin Zhongwai Taoci Huibian*.

YE, WENCHENG. [叶文程], 1988. *中国古外销瓷研究论文集 Zhongguo*

Guwaixiaoci Yanjiiu Lunwen Ji. Beijing: Zijincheng Chubanshe Press.

YE, WENCHENG. [叶文程], 2005a. *德化窑: 中国福建古陶瓷标本大系 Dehua Yao: Zhongguo Fujian Gutaoci Biaoben Daxi*. Fujian: Fujian Meishu Chubanshe.

YE, WENCHENG. [叶文程], 2005b. *福清窑 Fuqing Yao, 中国福建古陶瓷标本大系 Zhongguo Fujian Gutaoci Biaoben Daxi*. Fujian: Fujian Meishu Chubanshe.

YE, WENCHENG. [叶文程], 2005c. *光泽窑 Guangze Yao, 中国福建古陶瓷标本大系 Zhongguo Fujian Gutaoci Biaoben Daxi*. Fujian: Fujian Meishu Chubanshe.

YE, WENCHENG. [叶文程], 2005d. *华安窑 Hua'an Yao, 中国福建古陶瓷标本大系 Zhongguo Fujian Gutaoci Biaoben Daxi*. Fujian: Fujian Meishu Chubanshe.

YE, WENCHENG. [叶文程], 2005e. *闽侯窑 Minhou Yao, 中国福建古陶瓷标本大系 Zhongguo Fujian Gutaoci Biaoben Daxi*. Fujian: Fujian Meishu Chubanshe.

YE, WENCHENG. [叶文程], 2005f. *南靖窑 Nanjing Yao, 中国福建古陶瓷标本大系 Zhongguo Fujian Gutaoci Biaoben Daxi*. Fujian: Fujian Meishu Chubanshe.

YE, WENCHENG. [叶文程], 2005g. *莆田窑 Putian Yao, 中国福建古陶瓷标本大系 Zhongguo Fujian Gutaoci Biaoben Daxi*. Fujian: Fujian Meishu Chubanshe.

YE, WENCHENG. [叶文程], 2005h. *三明窑 Sanming Yao, 中国福建古陶瓷标本大系 Zhongguo Fujian Gutaoci Biaoben Daxi*. Fujian: Fujian Meishu Chubanshe.

YE, WENCHENG. [叶文程], 2005i. *漳平窑 Zhangping Yao, 中国福建古陶瓷标本大系 Zhongguo Fujian Gutaoci Biaoben Daxi*. Fujian: Fujian Meishu Chubanshe.

YE, WENCHENG. [叶文程], 2005j. *漳浦窑 Zhang Pu Yao, 中国福建古陶瓷标本大系 Zhongguo Fujian Gutaoci Biaoben Daxi*. Fujian: Fujian Meishu Chubanshe.

YE, ZHEMIN 1989. 中国陶瓷史纲要 Zhongguo Taocishi Gangyao. Beijing: Zhongguo Qinggongye Chubanshe.

YI, XIBING. [易西兵], 2013. 五代南汉国遗存概述 Wudai Nanhan Guo Yicun Gaishu. *岭南文史 Lingnan Wenshi* 3: 14-20.

YU, JIADONG. [余家栋], 1973. 江西玉山，临川和永修县明墓 Jiangxi Yushan, Linchuan He YOngxiu Xian Mingmu. *Kaogu* 5.

YU, JIADONG. [余家栋], 1984. 试析洪州窑 Shi Xi Hongzhou Yao, in W.W.B.J.W.Y.H. 文物编辑委员会 (ed.) *中国古代窑址调查发掘报告集 Zhongguo Gudai Yaozhi Diaocha Fajue Baogao Ji*: 94-101. Beijing: Wenwu Chubanshe.

YU, JIADONG. [余家栋], 1995. 江西吉安市临江窑遗址 Jiangxi Ji'an Shi Linjiang Yao Yizhi. *考古学报 Kaogu Xuebao* 2: 243-274.

YU, JIADONG. [余家栋], 2011. 江西仿龙泉青瓷与浙江龙泉青瓷之间的相互关系 Jiangxi Fang Longquan Qingci Yu Zhejiang Longquan Qingci Zhijian De Xianghu Guanxi, in ZGGTCYJH (ed.) *龙泉窑研究 Longquan Yao Yanjiu*: 473-481. Beijing: Gugong Chubanshe.

YU, WENRONG. [于文荣], 2002. 浅析唐代北方陶瓷工艺成就 Qianxi Tangdai Beifang Taoci Gongyi Chengjiu. *中国历史博物馆馆刊 Zhongguo Lishi Bowuguan Guankan*: 91-106.

YUAN, LIREN. [袁立仁], 2013. 景德镇兰田窑址发掘取得新突破 Jingdezhen Lantian Yaozhi Fajue Qude Xin Tupo. *陶瓷 Taoci*: 66-66.

YUBA, TADANORI. 2014. Chinese Porcelain from Fustat based on Research from 1988-2001. *TOCS* 76: 1-17.

ZARINS, J & ZAHRANI, A. 1985. Recent archaeological investigations in the Southern Tihama Plain (The sites of Athar, and Sihi, 1404/1984). *Atlal* 9: 65-107.

ZARINS, JURIS 2007. Aspects of recent archaeological work at al-Balīd (Ẓafār), Sultanate of Oman. *Proceedings of the Seminar for Arabian Studies*. JSTOR.

ZBSBWG. 1987. 淄博市博山大街窑址 Ziboshi Boshan Dajie Yaozhi. *Wenwu* 9: 11-20, 40.

ZENG, FAN. [曾凡], 2001. *福建陶瓷考古概论 Fujian Taoci Kaogu Gailun*. Fujian Ditu Chubanshe 福建地图出版社.

ZENG, GUANGYI. [曾广亿], 1962. 广东惠阳白马山古瓷窑调查记 Guangdong Huiyang Baimashan Gu Ciyao Diaocha Ji. *Kaogu* 2: 414-415.

ZENG, GUANGYI. [曾广亿], 1964a. 广东潮安北郊历代窑址 Guangdong Chao'an Beijiao Lidai Yaozhi. *Kaogu* 4: 194-195.

ZENG, GUANGYI. [曾广亿], 1964b. 广东惠阳新庵三村古瓷窑发掘簡报 Guangdong Huiyang Xin'an Sancun Guciyao Fajue Jianbao. *Kaogu* 4: 196-199.

ZENG, GUANGYI. 1964c. 广东惠阳新庵三村古瓷窑发掘簡报 Guangdong Huiyang Xin'an Sancun GuyaoFajue Jianbao. *Kaogu* 4: 196-199.

ZENG, GUANGYI. [曾广亿], 1965. 广东博罗, 揭阳, 澄迈古瓷窑调查 Guangdong Boluo, Jieyang, Chengmai Guciyao Diaocha. *Wenwu* 2: 19-25.

ZENG, GUANGYI. [曾广亿], 1985. 广东唐宋陶瓷工艺特点 A Study ofthe Characteristics of Tang and Song Ceramics of Guangdong, in FPSM (ed.) *广东 唐宋窑址出土陶瓷 Ceramic Finds from Tang and Song Kilns in Guangdong*: 32-63. Hongkong: Fung Ping Shan Museum.

ZENG, GUANGYI. [曾广亿], 1991. 广东瓷窑遗址考古概要 Guangdong Ciyao Yizhi Kaogu Gaiyao. *江西文物 Jiangxi Wenwu* 4: 84, 105-108.

ZENG, GUANGYI & WU, DINGXIAN. [曾广亿 & 吴定贤], 1977. 广东惠州北宋窑址清理简报 Guangdong Huizhou BeiSong Yaozhi Qingli Jianbao. *Wenwu* 8: 46-52.

ZGGSYXH. [中国硅酸盐学会], 1982. *中国陶瓷史 Zhongguo Taoci Shi*. Wenwu Chubanshe.

ZHAI, CHUNLING. & WANG, CHANGQI. [翟春玲 & 王长启], 1997. 青龙寺遗址出土"盈"字款珍贵白瓷器 Qinglongsi Yizhi Chutu "Ying" Zi Kuan Zhengui Baici. *考古与文物 Kaogu Yu Wenwu* 6.

ZHANG, BAI. [张柏], 2008. *中国出土瓷器全集一内蒙古 Complete Collection of Ceramic art Unearthed in China-Vol. of Inner Mengolia*. Beijing: Kexue Chubanshe.

ZHANG, HONGMING. [张宏明], 1988. 安徽巢湖市唐代砖室墓 Anhui Chaohushi Tangdai Zhuanshi Mu. *Kaogu* 6: 522-527.

ZHANG, JIA & XU, BING. [张家 & 徐冰], 1994. 福建建瓯东游下塘唐窑调查 Fujian Jian'ou Dongyou Xiatang Tangyao Diaocha. *Kaogu*: 573-576.

ZHANG, JINGHUI & CHEN, LIPING. [张景辉 & 陈丽萍], 2004. 简论长沙窑的兴衰 Jian Lun Changsha Yao De Xingshuai. *陶瓷研究 Taoci Yanjiu* 2: 36-38.

ZHANG, JINRU. [张金茹], 1995. 定窑瓷器分期初探 Dingyao Ciqi Fenqi Chutan. *文物春秋 Wenwu Chunqiu* 3: 43-49, 95.

ZHANG, LEFA. [张乐发], 1996. 湖北宜城市出土元代人物堆塑罐 Hubei Yichengshi Chutu Yuandai Renwu Duisu Guan. *Kaogu* 6.

ZHANG, RAN. [张然], 2012. 关于建立外销瓷记录法与其数据库应用的初步构想和内容 A Proposal to Create a Databased and Standardised Classification System for Chinese Trade Ceramics to Allow Enhanced Analysis and the Comparison of Assemblages, in ZGGTCYJH (ed.) *中国古陶瓷研究 Zhongguo Gutaoci Yanjiu* 335-351. Beijing: the Palace Museum Press.

ZHANG, RAN. [张然], 2013. 唐末印度洋大规模陶瓷贸易的兴盛——兼论邢窑与越窑在陶瓷贸易中的地位 A Sudden Rise of Chinese Ceramic Trade in the Late Tang Period, in ZGGTCYJH (ed.) *中国古陶瓷研究 Zhongguo Gutaoci Yanjiu* 409-422. Beijing: Gugong Chubanshe.

ZHANG, RAN & LI, XIAOXIN. [张然 & 李晓欣], 2013. Chinoiserie of English Pottery: The Influences between Chinese and English ceramics and the Development of the Willow Pattern. *Proceedings of the Conference of Maritime Silk Road 2012*.

ZHANG, RAN & YANG, XIAO. [张然 & 杨啸], 2014. 从英国王室珍藏看清代中英关系的变化 A Preliminary Study of the Chinese Ceramics of the Royal Collection: The Changes in Sino-British Relations in the 18th to 19th Centuries. *南方文物 Nanfang Wenwu*: 124, 125-129.

ZHANG, SHIQUAN. [张世铨], 1983. 广西桂平宋瓷窑 Guangxi Guiping Song Ciyao. *考古学报 Kaogu Xuebao* 4: 501-518.

ZHANG, SONGLIN. [张松林], 1984. 荥阳翟沟瓷窑遗址调查简报 Xingyang Zhaigou Ciyao Yizhi Diaocha Jianbao. *中原文物 Zhongyuan Wenwu* 4: 17-22.

ZHANG, TINGYU. [张廷玉], 1974. *明史 Ming Shi*. 中華書局.

ZHANG, XIANG. [张翔], 1989a. 龙泉金村古瓷窑址调查发掘报告 Longquan Jincun

Gu Taoci Zhi Diaocha Fajue Baogao, in ZJSQGYT (ed.) *龙泉青瓷研究 Longquan Qingci Yanjiu*: 68-91. Beijing: Wenwu Chubanshe.

ZHANG, XINGCAN. [张星烺], 1977. *中西交通史料汇编 Zhongxi Jiaotong Shiliao Huibian*. Beijing: Zhonghua Shuju Press.

ZHANG, ZENGWU. [张增午], 1999. 福建漳州地区明清瓷器略探 Fujian Zhangzhou Diqu Mingqing Ciqu Luetan. *福建文博 Fujian Wenbo* 35: 58-60.

ZHANG, ZHIZHONG & WANG, HUIMIN. [张志中 & 王会民], 1997. 邢窑隋代透影白瓷 Xingyao Suidai Tou Ying Baici. *文物春秋 Wenwu Chunqiu* 1: 26-30.

ZHANG, ZHONGCHUN. [张仲淳], 1989b. 明清时期的福建安溪青花瓷器 Mingqing Shiqi De Fujian Anxi Qinghua Ciqi. *Kaogu* 7: 617-623.

ZHAO, BING. [赵冰], 2006. 中世纪时期贸易中转港ー也门舍尔迈遗址出土的中国瓷片 Zhongshiji Shiqi Maoyi Zhongzhuan Gang-Yemen Sheermai Yizhi Chutu De Zhongguo Cipian, in X. CHEN & M. BUSSOTTI (eds.) *考古发掘与历史复原 Kaogu Fajue Yu Lishi Fuyuan*: 79-116. Beijing: Zhonghua Shuju.

ZHAO, BING. 2011. *Chinese Ceramics found in the western Indian Ocean: based on examinations of the Williamson Collections, Bing Zhao's visit to Durham University [personal communication]*. Durham.

ZHAO, BING. 2013. LUXURY AND POWER: The Fascination with Chinese Ceramics in Medieval Swahili Material Culture. *Orientations* 44: 71-78.

ZHAO, BING, CARTER, ROBERT & VELDE, CHRISTIAN. 2014. The Chinese Ceramic Sherds Unearthed at the Julfar al-Nudud Port Site in the Emirate of Ras al-Khaimah, United Arab Emirates. *Wenwu* 11: 34-46.

ZHAO, QING, ZHAO, XINPING, HAN, ZHAOHUI & WANG, BAOREN. [赵清, 赵新平, 韩召会 & 王保仁], 1996. 巩义市北窑湾汉晋唐五代墓葬 Tombs of the Han, Jin, Tang and Five-Dyansties Periods at Beiyaowan, Gongyi City. *Kaogu Xuebao* 361-369.

ZHAO, QINGGANG & ZHANG, ZHIZHONG [赵庆刚 & 张志中], 2007. *千年邢窑 Qiannian Xingyao*. Wenwu Chubanshe.

ZHAO, QINGYUN, FU, YONGKUI & ZHANG, DEQING. [赵青云, 傅永魁 & 张德卿],

1985. 郏县黄道窑址 Jiaxian Huangdao yaozhi, in HNSWWKGYJS (ed.) *河南古瓷窑址资料汇编 Henan Guciyaozhi Ziliao Huibian.* Henan: Henansheng Wenwu Kaogu Yanjiu Suo.

ZHAO, QINGYUN & LI, DEBAO. [赵青云 & 李德保], 1964. 河南省鹤壁集瓷窑遗址发掘简报 Henansheng Hebiji Ciyao Yizhi Fajue Jianbao. *Wenwu* 8: 1-12.

ZHAO, QINGYUN, WANG, ZHONGMIN & ZHAO, WENJUN. [赵青云, 王忠民 & 赵文军], 1988. 河南鲁山段店窑的新发现 Henan Lushan Duandianyao De Xin Faxian. *华夏考古 Huaxia Kaogu* 1: 45-63.

ZHENG, CHAOXIONG. [郑超雄], 1986. 广西合浦上窑窑址发掘简报 Guangxi Hepu Shangyao Yaozhi Fajue Jianbao. *Kaogu* 12: 1099-1103.

ZHENG, DONG & CAI, HONGYONG. [郑东 & 蔡鸿涌], 1999. 厦门古代瓷业及其年代分期 Xiamen Gudai Ciye Jiqi Niandai Fenqi. *福建文博 Fujian Wenbo* Additional Version: 156-161.

ZHENG, JIANMING. [郑建明], 2009. 浙江商周原始青瓷 Zhejiang Shang-Zhou Yuanshi Qingci, in Q.H. SHEN (ed.) *瓷之源 Ci Zhi Yuan*: 14-25. Hangzhou: Zhejiangsheng Bowuguan Chubanshe.

ZHJSBWG, LZSWHJ & GDSWWKGYJS. [湛江市博物馆, 雷州市文化局 & 广东省文物考古研究所], 2003. *雷州窑瓷器 Leizhouyao Ciqi*. Lingnan Meishu Chubanshe.

ZHOU, JUN, LI, WEIDONG, LIU, YANFENG & HAO, HONGXING. [周军, 李卫东, 刘彦锋 & 郝红星], 1995. 河南密县西关瓷窑遗址发掘简报 Henan Mixian Xiguan Ciyao Yizhi Fajue Jianbao. *Kaogu* 6: 543-560.

ZHOU, SHIRONG. [周世荣], 1978. 从湘阴古窑址的发掘看岳州窑的发展变化 Cong Xiangyin Guyaozhi De Fajue Kan Yuezhou Yaode Fazhan Bianhua. *Wenwu* 1: 69-77.

ZHOU, SHIRONG. [周世荣], 1982. 长沙唐墓出土瓷器研究 Changsha Tang Muzang Chutu Ciqi Yanjiu. *Kaogu Xuebao* 4: 509-522.

ZHOU, SHIRONG. [周世荣], 1984a. 略谈湖南元明清陶瓷 Luetan Hunan Yuan Ming Qing Taoci. *景德镇陶瓷 Jingdezhen Taoci* 26: 67-79.

ZHOU, SHIRONG. [周世荣], 1984b. 湖南衡阳窑调查纪要 Hunan Hengyangyao Diaocha Jiyao, in W.W.B.J.W.Y.H. 文物编辑委员会 (ed.) *中国古代窑址调查发掘报告集 Zhongguo Gudai Yaozhi Diaocha Fajue Baogao Ji*: 239-245. Beijing: Wenwu Chubanshe.

ZHOU, SHIRONG. [周世荣], 1984c. 湖南唐宋窑址分期和陶瓷的主要特点 Hunan Tangsong Yaozhi Fenqi He Taoci De Zhuyao Tedian. *景德镇陶瓷 Jingdezhen Taoci* 2: 49-58.

ZHOU, SHIRONG & FENG, YUHUI. [周世荣 & 冯玉辉], 1984. 湖南青瓷与青花古窑址调查报告 Hunan Qingci Yu Qinghua Guciyao Diaocha Baogao. *湖南考古集刊 Hunan Kaogu Jikan* 2.

ZHOU, SHIRONG, ZHANG, ZHONGYI & SHENG, DINGGUO. [周世荣 & 张中一], 1984. 湖南古窑址调查之一—青瓷 Hunan Yaozhi Diaocha Zhi Yi - Qingci. *Kaogu*: 915-926.

ZHOU, SHIRONG & ZHENG, JUNSHENG. [周世荣 & 郑均生], 1985. 湖南古窑址调查之二—彩瓷 Hunan Guyaozhi Diaocha Zhi Er-Caici. *Kaogu* 3: 241-256.

ZHOU, ZHENHUA. [周振华], 1994. 都昌周溪唐窑遗址 Duchang Zhouxi Tangyao Yizhi. *Kaogu*: 476-477.

ZHU, BOQIAN. [朱伯谦], 1981. 浙江上虞县发现的东汉瓷窑址 Zhejiang Shangyu Xian Faxian De Donghan Ciyao Zhi. *Wenwu* 10: 33-35.

ZHU, BOQIAN. [朱伯谦], 1989a. 龙泉大窑古瓷窑址发掘报告 Longquan Dayao Guci Yaozhi Fajue Baogao, in ZJSQGYT (ed.) *龙泉青瓷研究 Longquan Qingci Yanjiu*: 38-67. Beijing: Wenwu Chubanshe Press.

ZHU, BOQIAN. [朱伯谦], 1989b. 龙泉青瓷简史 Longquan Qingci Jianshi, in ZJSQGYT (ed.) *龙泉青瓷研究 Longquan Qingci Yanjiu*: 1-37. Beijing: Wenwu Chubanshe.

ZHU, BOQIAN. [朱伯谦], 1998. *龙泉窑青瓷 Longquanyao QIngci*. 艺术家出版社 Yishujia Chubanshe.

ZHU, JIANMING. [朱建明], 1989c. 浙江德清原始青瓷窑址调查 Zhejiang Deqing Yuanshi Qingci Yaozhi Diaocha. *Kaogu* 9.

ZHU, JIANMING. [朱建明], 1990. 隋唐德清瓷窑址初探 Suitang Deqing Ci Yaozhi Chutan, in ZGGTCYJH (ed.) *中国古陶瓷研究 Zhongguo Gutaoci Yanjiu* Beijing: Zijincheng Chubanshe.

ZHU, SHAOHOU. [朱绍候], 2000. *中国古代史 Zhongguo Gudaishi*. Fujian: Fujian Renmin Chubanshe.

ZHU, SIBEN. [朱思本], 1989d. *北海释 Bei Hai Shi*. (丛书集成续编 Congshu Jicheng Xubian. Taipei: Xin Wen Feng Chubanshe Press.

ZHU, TUSHENG. [朱土生], 1995. 浙江龙游方坦唐乳浊釉瓷窑址调查 Zhejiang Longyou Fantan Tang Ruzhuoyou Yaozhi Diaocha. *Kaogu*: 403-406.

ZHUANG, WENBIN. [庄文彬], 1994. 四川遂宁金鱼村南宋窖藏 Sichuan Suining Jinyucun Nansong Jiaocang. *Wenwu* 4: 4-27.

ZJBWG. [镇江博物馆], 1985. 江苏镇江唐墓 Jiangsu Zhenjiang Tangmu. *Kaogu* 2: 131-148.

ZJSBWG. [浙江省博物馆], 2000. *浙江纪年瓷 Zhejiang Jinian Ci*. Beijing: Wenwu Chubanshe.

ZJSBWG. [浙江省博物馆], 2009. *窑火遗韵 Yao Huo Yi Yun*. Zhejiang: Zhejiang Guji Chubanshe.

ZJSKWWKGYJS, BJDXKGWBXY & CXSWWGLWYH. [浙江省文物考古研究所, 北京大学考古文博学院 & 慈溪市文物管理委员会], 2002. *寺龙口越窑址 Silongkou Yueyao Zhi*. Beijing: Wenwu Chubanshe.

ZJSWWKGYJS. [浙江省文物考古研究所], 2005. *龙泉东区窑址发掘报告 Longquan Dongqu Yaozhi Fajue Baogao*. Beijing: Wenwu Chubanshe.

ZJSWWKGYJS, BEDXKGWBXY & LQQCBWG. [浙江省文物考古研究所, 北京大学考古文博学院 & 龙泉青瓷博物馆], 2009. *龙泉大窑枫洞岩窑址出土瓷器 Longquan Dayao Fengdongyan Yaozhi Chutu Ciqi*. Beijing: Wenwu Chubanshe.

ZSSBWG. [樟树市博物馆], 1991. 江西樟树发现隋唐窑址 Jiangxi Zhangshu Faxian Suitang Yaozhi. *Kaogu* 10: 953-954.

ZZSWWGLZ. [枣庄市文物管理站], 1984. 山东枣庄古窑址调查 Shandong

Zaozhuang Guyaozhi Diaocha, in W.W.B.J.W.Y.H. 文物编辑委员会 (ed.) *中国古代窑址调查发掘报告集 Zhongguo Gudai Yaozhi Diaocha Fajue Baogao Ji*: 374-385. Beijing: Wenwu Chubanshe.